THE AMERICAN GAS LIGHT JOURNAL

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[NOTICE.]

Wrinkle Department, The American Gas Institute.

To the Membership, American Gas Institute: All members of The American Gas Institute, and others interested, are requested to contribute a description of any novel device or scheme covering any feature of the gas business. Every department of every Company uses some novel stunt which would be of value to others. The object of this department is to compile such information. The value of the report depends entirely on the co-operation received. Send in your contribution at once to

MILAN R. BUMP, Editor,
60 Wall street, New York.

BRIEFLY TOLD.

OBITUARY NOTE.—MR. J. Q. A. SPEAR.—With much regret we are called upon to chronicle the death of Mr. John Q. A. Spear, formerly Superintendent of the Dorchester (Mass.) Gas Light Company, who passed away at his residence, 76 Minot street, Dorchester, the morning of the 2d inst. Mr. Spear was born in Boston, July 19th, 1824. In 1830 his parents removed to Hampden, Me., where deceased was given his early education, chiefly at the Hampden Academy. While still a youth he elected to follow a mariner's work—his father and uncle were sea captains. In time his family removed to Neponset, a suburb of Dorchester, Mass., and, tiring of the sea, deceased served a 3 years' apprenticeship with the firm of Robinson & Blanchard, a prominent building firm of that time in Dorchester. Mr. Spear boarded with the family of Mr. Robinson, which fact is mentioned here so that it may be further stated in this connection that Mrs. Robinson is now living and in good health in her 102d year. His apprenticeship ended he entered into partnership with Mr. Lemuel Hunt, and the firm constructed many buildings, some of which were quite noted architectural specimens of the day and time. This partnership lasted until Mr. Spear was appointed Superintendent of the Dorchester Gas Light Company, to which position he succeeded Mr. William Brooks in 1873. He retired from that service in 1889, enjoying in the remaining period the fruits of his industry. He became a member of the New England Association of Gas Engineers several years ago, and was on its rolls at the time of his death. He was also affiliated with the American Gas Light Association. In 1851 he was united in marriage to Mary Jillson, of Williamstown, Vt., and the surviving issue of this union is Mr. James N. Spear, Superintendent of the South Boston (Mass.) Gas Light Company. Mrs. Spear died in 1888. The funeral services were held the afternoon of the 5th inst. For the facts contained in this narration we are indebted to the attention of Mr. N. W. Gifford.

THE IOWA DISTRICT ASSOCIATION MEETING.—A special correspondent in Des Moines, writing to the JOURNAL under date of the 17th inst., says: Dear JOURNAL—The Iowa District Gas Association has concluded a most successful convention at Cedar Rapids, Ia. The meeting was very well attended and all the papers met with free and frank discussions. Twenty-nine new members were enrolled in the Association, an increase of over 50 per cent., and this, with the strict limitation set

LIBRARY OF CONGRESS. JUN 24 1907 SMITHSONIAN DEPOSIT.

by the Association, that active membership shall be confined to Iowa, Nebraska and South Dakota. The opening session, the morning of June 12th, was taken up with general business and the reading of the paper by Mr. Haines, of Des Moines, on the "Attitude of Gas Companies Toward the Public." During the afternoon session officers for the ensuing year were elected, and the paper by Mr. Waring, of Omaha, upon "The Organization of Gas Companies in Towns of Less than 10,000 Inhabitants" was read and freely discussed. The session adjourned early to enjoy an automobile ride given by the Cedar Rapids Gas Light Company, which was followed in the evening by a very clever vaudeville entertainment at an open air theater. The two sessions Thursday and Friday were taken up with the reading and discussion of the balance of the papers and with a consideration of the assigned discussion topics. The able chairmanship of Mr. George McLean, of Dubuque, brought out much interesting data in the discussions that might otherwise have been overlooked. The annual banquet, which was held at the Montrose Hotel parlors, was a distinct success. The post of Toastmaster was delightfully and effectively filled by Colonel E. G. Pratt, and clever and timely speeches were made by Senator Truitt and Mr. G. F. Boyd, of Cedar Rapids, and by Messrs. McLean, Clabaugh and Haines, members of the Association. Mr. Parker, of the Eclipse Stove Works, added much to the evening with a series of very amusing stories. The convention adjourned to meet in Omaha in June, 1908.—DES MOINES.

A TIMELY CRITIC AND AN INTERESTING ONE.—Mr. Godfrey L. Cabot, writing from Boston, Mass., under date of the 18th inst., says: I read with the utmost interest the article on rare earths and the incandescent mantle, by Mr. Frederick Bonnet, Jr., in your issue of May 27th. In this article he speaks of two elements, dysporsium and holmium, which I do not find in the list of elements at my disposal, and I feel sure it would interest many of your readers to learn more of these unfamiliar elements, when they were discovered and what their atomic weights. Also, what efforts have been made to use any of these rare elements or their oxides for incandescent electric light filaments. Referring to the very lucid article on gasoline from gases, on page 192 of your JOURNAL, gasoline collects in considerable quantity in the water-catches which are necessary to collect and eliminate the moisture that condenses in cold weather from natural gas. This is not, of course, true of all natural gas. There are regions and strata in which the gas wells do not produce any gas sufficiently rich in gasoline, to show gasoline in the water-catches, even in the coldest weather, but from the deeper strata and in the vicinity of oil regions it frequently happens that gasoline collects in quantity that justifies its being saved and utilized commercially, under present market conditions, and many of the great natural gas companies would add somewhat to their earning power if they would give this matter attention and systematically collect the gasoline thus obtained in their water-catches. The amount is very small in proportion to the value of the gas itself, but the expense of collecting is also very small. Ninety-nine field men out of 100 in the oil regions will assure you that the gas lines are plugged in winter by frozen gasoline. This curious misapprehension arises from the fact that the invisible aqueous vapor in the gas itself condenses in the form of frost in the interior of the pipe, and that a small percentage of gasoline is absorbed by this frost as a sponge absorbs water, wetting only the roots of the frost crystals. If now a match is brought near, the gasoline instantly catches fire, the frost melts and disappears, and the observer thinks that he has ignited frozen gasoline. If instead of igniting the gasoline the mixture is collected and melted the result is water below and a layer of gasoline upon its surface, and usually the amount of water greatly exceeds the amount of gasoline. No temperature ever found on the earth's surface is low enough to congeal gasoline, nor does gasoline crystallize when frozen. I recently tested the freezing point of three different grades of gasoline, with the help of liquid air, which Prof. Sanger, of Harvard College, was kind enough to place at my disposal for that purpose, and found that gasoline having a specific gravity of 0.698 remains perfectly liquid at 110° below zero, C., and began to show a slight butteriness at about 122° below zero, C., and got stiffer and stiffer until at about 149° C. below zero it becomes as hard as horn, and looks exactly like pure, white vaseline. Gasoline of a specific gravity of 0.725 shows almost exactly the same congealing point. From the entire absence of any definite freezing point is probably due to the fact that gasoline is a mixture of various chemical compounds of different molecular weight and having a different freezing point. So far as I know, or have been able to ascertain, nothing has been previously published on this particular matter of the freezing point of gasoline.

Address of the President (Mr. George B. McLean) of the Iowa District Gas Association, Delivered on the Occasion of Its Third Annual Meeting, Cedar Rapids, Ia., June 12-14.

Gentlemen of the Iowa District Gas Association:

In assembling for this, the third annual convention of our Association, it is gratifying to contemplate the prospects of an interesting and profitable programme a prospect for which we are chiefly indebted to our efficient Secretary, Mr. G. I. Vincent.

The papers prepared for us relate to matters of present and practical interest to every member of this Association. I feel assured that the gentlemen who have prepared them with much care will receive close attention and I hope that the discussions following will be shared by the members generally. One of the advantages of a small Association like ours is that it gives every member full opportunity for free discussion of the subjects presented. Candid discussion at these meetings is really necessary to the highest benefit of this body.

Along with those devoted to the engineering, and the economic or administrative, we are to have two papers dealing with the commercial or selling end of our business, one of them dealing exclusively with gas for lighting. This is pleasing, for the merits of gas as an illuminant have not been adequately presented to the public.

Our selling departments have yet much to do in acquainting light users with the merits and varied use of gas arc lamps, inverted gas lamps, distance or pneumatic lighters, and with the low cost, absolute and comparative, of incandescent gas lighting, and in illustrating to them the artistic effects procurable with handsome gas fixtures, lamps and glassware.

The public hardly realize that gas light, being more diffusive, is better for the eye than some competing illuminants. Only a few have thought of the matter sufficiently to realize that, for a given candle power, the gas light has a larger area and a lower intensity than some others, and that this is why it is more diffusive, hence, easier on the eyes.

We should also find a way of letting the public know that a heat producing light is best for ventilation, and that, when lighted with gas, a room or auditorium has a purer air and better ventilation than if its lighting produced less heat, or no heat at all. We should further let the public know that, besides being more sanitary, more diffusive and more economical than competing illuminants, gas is the safest of lights, as the statistics of fire insurance companies amply prove. One explanation of its comparative safety is the providential fact that, unlike most other fluids, gas possesses a strong odor which reveals the existence and the location of defective joints and leads to their repair before shocks or fire cause injury or damage.

Our Association has no problems before it which are peculiar to its own District, and this may be matter for congratulation. And we may congratulate the gas fraternity generally upon the distinction achieved in recent years that, while prices of commodities and services generally and of the labor and materials used in our own production, have largely advanced during this period, the price of gas has steadily declined and is now cheaper than ever before. Here is the proof that the consumer has participated in the benefits of the progress the gas industry has made in recent years—progress in all departments of the business, production, distribution and administration.

We are to have a timely paper by Mr. L. K. Reuping, on "Experiences in Operating Water Gas Machines." Timely, because existing labor conditions have directed attention to the advantage to be gained by supplementing even the most modern and efficient coal gas plant with water gas apparatus, even though the latter be operated seldom if at all. The water gas plant is a reserve, or protection, against the emergency created when extortionate demands are made by the men employed in the operation of a coal gas plant. Such demands are not likely to be made when a water gas plant is available.

We are to be favored with a paper on "The Attitude of Gas Companies Towards the Public," by Mr. Jensen Haines, of Des Moines, a gentleman most capable of illuminating the subject. The present has been called an era of radicalism and hysteria in respect to the public's attitude toward public service corporations and large combinations of capital. The great insurance companies and the railway companies which encountered the hostility of many legislatures the past winter, will not dispute this proposition. In some quarters this radicalism has taken the form of demand for physical valuation of the properties of public service corporations and strict regulation of capitalization with a view of reducing their charges, or, as the Socialists would say, ending their "exploitation" of the public. Some advocates of extreme measures in these directions have claimed for their propositions the sanction of

President Roosevelt. In his recent speech at Indianapolis he made it clear that this claim is unfounded and that he has no sympathy with the physical valuation proposition when the same is advanced for the purpose of limiting the public service corporation to the legal or prevailing rate of interest on its actual investment or upon the reproductive cost of the physical property used in the operation of the business. The Socialists of England candidly avow this purpose and support it on the theory that profit in admininistering to the wants of the public is illegimate and unjust, and that, therefore, such service should be rendered by the public itself at cost. They now have a campaign underway in that country for the purpose of reducing the dividends of the railway companies below a basis satisfactory to investors for the purpose of compelling them to sell to the public. Such would be the desire of public service corporations in this country were the sentiment to prevail that profit above the legal rate of interest is illegitimate when made in the administration of public utilities. For, to deprive these corporations of participation in the benefits of the economies worked out through their own efforts would be to deprive investors of motive for venturing in this field. Happily, the judgment of the commercial world condemns a policy towards public service corporations by the general or local government which would drive private enterprise out of the field and thus end the progress in which, as we have seen, the consumer has shared so liberally in the past, and more especially during the recent period of general advance in prices and in cost of living.

Gas Arc Maintenance, Methods and Results.

[A paper prepared for the Third Annual Meeting of the Iowa District Gas Association, by MR. J. C. Grey, Des Moines, Ia]

In recent years the gas arc has taken a very important part in the appliance department of every gas company in the country. The reason for its prominence is in the fact that it occupies a position that is practically new in the gas industry, namely: Large unit lighting, which has opened a new and extensive field for gas sales. It has established its position in the gas industry and needs no introduction to the public. However, the arc brings with it the need of care and repairs, and the essential fact that confronts the gas man who installs arcs in the business houses of to-day is their maintenance, and the writer considers that, without gas company maintenance, the gas arc lighting feature is incomplete.

In the first place the inspection of arc lamps must be very thorough. The trimmers must clean the bunsens and gauzes of all the burners, replace the mantles and clean all glassware. Some arcs require more frequent attention than others, depending on the number of hours that they are lighted. The average arc lamp, however, will not require more than three inspections per month; outside arcs, and those burning from 12 to 24 hours per day, will have to be attended to at least four times. If the bunsens and gauzes are thoroughly cleaned and adjusted it will not be necessary to repeat this at the next inspection, as the mantles and glassware only will require attention. This procedure has proved satisfactory in a great many cities.

The foreman inspector should have entire charge of the maintenance department, being authorized to employ and discharge the trimmers as he may see fit. Following the work from day to day he is able to keep in touch with each man's territory and observe the quality of his work. He should also be given all unpaid maintenance bills to collect, as the failure to pay promptly usually means that there has been some dissatisfaction in service, which information should, of course, be in the possession of the man in charge. The inspector should call in person on all parties making complaints to the office and see that the arcs are put in proper condition. It is not necessary for him to call on each consumer, as he can keep in touch with the work by carefully noting the daily reports of his men.

A loose-leaf record book has been found very advantageous for trimmers to work from. Each consumer has a separate sheet and these sheets are placed in rotation according to streets and numbers. They have blank spaces to be filled in by the trimmers, as follows: Date, number of lamps cleaned, number of mantles used, number of mantles broken, globes used, shades used, trimmer's initials, and last, but by no means the least, the consumer's signature, showing that the work has been completed satisfactorily. These sheets are ruled in months, being made large enough to allow 6 months on each side, with space for four calls in a month. The history of each lamp is in this way kept before you for the whole year, so any excessive use of mantles can be at once investigated and remedied. The trimmer should have the consumer sign this book at each visit, as it is very important in case of any dispute over maintenance charges and serves as a check on the trimmer's daily report. Trimmers should make a report of each day's work on a special blank made for this purpose, so that the total number of lamps cleaned, mantles used and broken by each trimmer can be noted without going through his book. These reports can be compared with the books from time to time, so that there will be no chance for the trimmer to get credit for more work than he really does. They also can be used further to advantage. The inspector when looking over the lamps in a territory can take the previous day's report with him, verify each job, note whether the lamps have received proper attention and receive any complaints that the consumer may have to make.

DAILY REPORT. DATE 190

Jobs.	Name.	Street No.	Street.	No. Arcs Cleaned.
1				
to				
25				

Inspcetor..... Total.....

INSIDE ARCS. .....GAS COMPANY.

No. Arcs.....Kind..... ....Installed.....No..... .....St.

No. Arcs.....Kind..... Installed.....Name.....

Maintenance per Mo.....

Date.	Lights Cleaned.	No. of Mantles.	Globes. Clear.	Globes. Opal.	Shades. Upper.	Shades. Lower.	Other Material.	Paid.	Inspector.	Consumer's Signature: The Gas Arcs at the above address have this day been cleaned and inspected satisfactorily.
March										
to										
August										

Trimmer's Loose Leaf Working Sheet.

A number of plants have recently inaugurated a bonus system that seems to work successfully in this particular line. A certain sum of money is offered to the man using the least number of mantles per total lamps cleaned and receiving the least number of complaints. The bonus can be divided into three prizes—first, second and third—so as to encourage more men to work for it. This system requires little or no bookkeeping, for the daily reports of the inspector will show the number of lamps cleaned and mantles used, leaving only the complaints to be kept track of, which can be done by the inspector. This system will not only tend to decrease the number of mantles used but it will discourage dishonesty and carelessness in the handling of mantles. It will work against one of the greatest disadvantages in maintaining lamps at a fixed sum per month, which has been that the consumer insists in a great many cases, on having black and split mantles replaced every time, in spite of the fact that the carbon on the mantles can be burned off and the split turned toward the center of the lamp, allowing it to be used until broken. This alone would save a great many mantles.

No fixed rule can be followed in regard to the class of labor to employ in trimming arcs. In this work, as in any other line, the foreman inspector must do his best with the material at hand. The best manner in which to make the maintenance expensive is to engage cheap and incompetent help to take care of the arc lights. Though in some towns boys have been used successfully, as a general thing they give very poor satisfaction unless followed continually. In 9 cases out of 10 where a boy will get into trouble with the consumer a man will have no difficulty whatsoever. It will not only be found that fewer complaints will result from employing men, but a great saving can be

made on the number of mantles used, and this in itself is no small item, as a trimmer can easily make or waste his day's pay by a little carelessness and lack of judgment. This kind of trimmer would not have to go far before the cost of mantles would cause maintenance to be a very expensive proposition.

A lamp trimmer should have a certain specified territory or number of lamps to attend to and, as far as possible, have a fixed time to make his calls at each place. It would seem nearly impossible to do this, but in practice it works out very satisfactorily, so much so, in fact, that the calls can be timed almost to the minute. For instance, in window lighting the only time to inspect the lights would be when the window decorations were being changed or dusted. If the trimmer knew just when this work was to be done, and made arrangements beforehand, he would be able to be there and attend to the lamps without inconveniencing the consumer.

The number of lamps which can be handled by a trimmer depends entirely upon their location, not only as to the number in each business house, but also the distance between calls. In the downtown districts a good man will have no difficulty in handling from 50 to 60 arcs per day, or 300 to 360 per week, while in a scattered territory he will be unable to attend to more than 40 per day, or 240 per week. Under average conditions a man should have no difficulty in attending to 50 lamps per day. Assuming that we pay these men $1.75 per day, this will make the labor cost 3½ cents per lamp for each inspection. Including car fare and the time of the foreman inspector, it will amount to 4 cents per 4-light arc per visit, which makes this item approximately cost 12 cents per month with three inspections.

Although the mantle consumption on outdoor arcs is considerably higher than on indoor arcs, the average will be about 1½ mantles per 4-burner arc per month. Using strictly high grade mantles at 10 cents each, this will amount to approximately 13½ cents per month. To this must be added the cost of replacing occasional broken globes, magnesia rods, burner caps, etc., which additional expense averages about 5 cents per lamp per month.

Assuming, therefore, that the labor cost is .04 per 4 burner arc per visit or 12 cents per month, with a mantle consumption of 13½ cents per month plus .05 for additional expense, we have a total of approximately 3 cents per lamp per month.

These results will vary considerably in different places, depending upon conditions and methods of operation. Where the arcs are all installed on straight sales by the gas company, it would seem as though the arcs could all be attended to at a flat rate of 3 cents per arc per month, making three regular inspections. This would assure good service and little or no expense to the company. In some towns, where more frequent inspections are made, a higher maintenance charge is necessary, running from 50 cents to 75 cents per lamp per month.

In business places where one or two arcs are installed, the labor cost per lamp will undoubtedly exceed installations of six or more. Some companies have maintained arcs like these on a sliding scale basis, decreasing the charge per arc as the number of arcs increases. This method, though it works out fairly well, causes more or less dissatisfaction among the small business houses where they only need a few arcs. Inasmuch as an arc in an isolated location requires practically the same amount of material, only the labor cost being raised a few cents, the best and most satisfactory plan would be to charge a flat maintenance rate for all arcs, treating all consumers alike.

Where arcs are rented and maintained at a fixed rate, in some cases 50 cents per month, sometimes considerable trouble is found in collecting for the 3 summer months, as the lamps are seldom used at this time of the year. Where this trouble arises it has been found necessary to either remove the arcs or to omit the maintenance and rental charges for the 3 months; the latter seems to be the better of the two methods, as the loss of $1.50 for 3 months will practically offset the labor cost of removing the arc, losing the 4 mantles in use and installing it again in the fall. If the arc was removed the consumption of gas would not only be lost during that time, but the expense of soliciting the business again in the fall would be added as well as the risk of not being able to re-install it, in which case the competitor would be given an excellent opportunity to establish himself.

Summing up the whole situation, it would seem that the ideal system of maintaining lamps would be to decide on a fixed amount per lamp per month, depending upon the cost of labor and material, the number of inspections per month and the location of the lamps, and charge this sum for all lamps. Keep a separate maintenance sheet for each lamp and have it numbered so that at any time one would be able to arrive at the amount of material used on any and all lamps maintained. Employ first-class help and operate a bonus system, awarding cash prizes to the men cleaning the most lamps, using the least number of mantles and receiving the least number of complaints.

[Concluded from Page 1021.]

SIXTH ANNUAL MEETING, WISCONSIN GAS ASSOCIATION.

HELD AT HOTEL PFISTER, MILWAUKEE, WIS., MAY 15-16, 1907.

SECOND DAY—MORNING SESSION.

The President—A matter suggested for consideration is the appointment of a committee respecting affiliation with the American Gas Institute. What is your pleasure?

On motion of Mr. Williamson, the President was empowered to appoint a committee of three to confer with the American Gas Institute in reference to the affiliation of the Wisconsin Gas Association with the former.

COMMITTEE ON AFFILIATION.

The President appointed as such committee Messrs. E. G. Cowdery, S. J. Glass and E. G. Pratt.

FINISHING THE QUESTION BOX.

The President—A few queries remain in the Question Box. The first one is:

> "Do gas companies make any particular effort to follow up building operation, and see that all new houses and flats are piped for gas? In case buildings are both wired and piped, is any particular effort made to induce people to use gas? Do they follow up cases of that kind and induce people to put in the latest improvements in lamps, etc., in order to get the best results from using gas? If this is not done, what is the reason?"

Mr. Rutledge, what is the practice of the Milwaukee Company in relation to this?

Mr. Rutledge—The Milwaukee Company, of course, has solicitors out, each one of whom has a territory to look after; consequently, all the new buildings going up in his territory are placed in his care, and we receive a report in each and every case from him stating whether the building is to be piped or not. In case the report is to the effect that the building is not to be piped, it is taken up with the architects and followed on until we succeed in getting it piped. I do not believe I caught the last part of that question.

Question re-read by the President.

Mr. Rutledge—They are followed up by the solicitor and by advertising on the gas bill. Approved burners are advertised on stickers and kept constantly before all our consumers; that is, by consumers in this case is meant those who use fuel, etc.

The President—Mr. Luebkeman, what is your practice in relation to that?

Mr. Luebkeman—We follow it up with the solicitors and on the ground. While tramping the streets they inquire about every new job they see. Get after that business on the line suggested by Mr. Rutledge.

The President—Has anyone else anything to offer regarding this subject? Question No. 15 is:

> "If it were possible to use but one advertising medium in exploiting the sale of gas, which would be most profitable."

Mr. Walker, have you any thought on the subject?

Mr. Walker—It seems to me the question is wrongly put. I never heard of an instance where there was only one possible way to advertise. As to which one would be the best of any that could be suggested would depend, in my opinion, entirely on the circumstances and conditions surrounding the work at that time. I do not understand the question.

The President—It asks if it were possible to use but one advertising medium, which would be the most profitable?

Mr. Walker—I don't understand the question because so many ways of advertising seem open to everybody. If they are limited financially to one class of advertising that settles the matter as to which kind they can use, which kind of course is the cheapest kind. Whether it is the best or not is another question.

Mr. Roper—At the meeting of the Commercial Gas Association this kind of a discussion was up, not exactly on this same question; but I think I can work it in. I made the remark at that time that I would like to make now. The Editors crossed out my remarks because they said they didn't think I meant them. I have had a few months to think it over, and I have not only thought it over, but I have talked it over with some of the people at whom they thought it was aimed at that time, and I want to say now that I not only meant it then but I mean it now, and am willing to stand back of it, and it don't make any difference whether they like it or not. I never was in the habit of saying much that I wasn't willing to stand behind. But that question came

up, and I think to-day that it would answer your question as to the best method of advertising. I said at that time when the discussion came up as to advertising, and holding your meeting weekly or monthly, and so on, and about your solicitors and what they should do, and how you should get the business, and I simply say now that you want to start at the head, the president or the manager, or the board of control, whoever that may be, and if you start in with them and inject a reasonable amount of enthusiasm into the president or the manager you will find that your solicitors have got the enthusiasm, the office boy has got the enthusiasm, and the man that digs in the ditch has got the enthusiasm, and it is enthusiasm that is the best method of advertising, and it doesn't make any difference where you get it from; and if the president hasn't got it he has no right to expect it of anybody else, and if he has got it you will find that everybody else has got it, and you will find that it is the successful kind. [Applause.]

The President—Any other member anything to offer in relation to the question?

Mr. Cowdery—I quite agree with what Mr. Roper has said, and there is no doubt that his statements are perfectly true, but I presume that the question we are lead up to is the point of printed advertising matter. What is the best shape to put this printed advertising matter in to get the best results? I have been paying a great deal of attention to advertising for a great many years, and consequently have formed my opinions. I think it would be hard probably for any of us to furnish any actual proof of the best kind of printed advertising matter, because we don't go at it systematically enough to keep track of it, and see what it accomplishes in order to tell which kind proves the best. I believe myself very thoroughly that you will get more for your money in newspaper advertising than in any other one kind of advertising that you can adopt. I do not mean by that that I would depend solely upon newspaper advertising because there are many other methods that are good. But if you want to ask for that which is really the best, I believe you will get more for your money through newspaper advertising than you will in any other one way. There is a lot of newspaper advertising that is absolutely of no account. Newspaper advertising to count at all must be properly inserted and be worded properly so as to attract the attention of the reading public; but any notice in a newspaper, if properly inserted, and properly worded, will come to the attention of more people for the same amount of money spent than probably any other one method that can be adopted.

Mr. Johnson—I favor newspaper advertising, properly carried out. The idea of running one "ad." for a great number of days is something that I think has long gone by. But newspaper advertising by continual change is bound to interest the people in the gas end of it. It is the women that you are catering to a great deal; and, goodness knows, the women are always looking at newspaper advertising for bargains.

Mr. Lindl—From what little experience I have had in advertising, especially in a city where the gas business is pretty well developed, I have come to the belief that the kind of advertising that will do the most good is advertising directly by mail, for the reason that in advertising directly by mail you reach the people whom you are wanting to reach. Newspaper advertising is good in many instances, but say, for instance, you have a city as well developed as our city of Madison is, where nearly all the people are using gas. Say that 30 per cent. of the people in that city read the papers; out of every 40 or 50 who read the papers, perhaps 1 or 2 or 3 will see the "ad ;" out of those 3 who read it there cannot be more than 50 per cent. of prospects, and my experience is that out of about 20 prospects one sale can be made if followed out. Therefore, I believe in advertising by mail. Of course, there is a great deal of advertising in the newspapers, for those who use the gas, to get them to use more. So it depends a great deal on what kind you are exploiting, which method to use to get the best results.

The President—Mr. Kelsey, we have been waiting for you to help us discuss this question and arrive at some conclusion:

> "If it were possible to use but one advertising medium in exploiting the sale of gas, which would be the most profitable?"

Mr. Kelsey—The managers who have spoken have had a good many years of experience and have given their opinion to it, so it may be rather presumptuous in me to give an opinion based upon only a few years' experience. It strikes me the question is rather ambiguous, for the reason that you might just as well ask if it were possible for human beings to eat only one kind of food what would be the best. Now the kind of food that would do for a Spanish prince would hardly do for people differently situated, and the kind of food that the laborer in the ditch would eat would be of different consistency and different in volume from that of the general manager's diet. [Laughter.] I think you catch my point—and for the reason that you can't possibly hope to get results by clinging to any one kind of advertising. If the question meant what one piece of advertising, if put before a man, would have the greatest impression upon him, I think you will all agree with me that the personal letter would have the strongest result, and in lieu of the personal letter the letter that most clearly, or most nearly approximates to it in form, for the reason that any man who receives a letter under a 2-cent stamp will open it and read it. Of course, when you are pushing appliances you must have the particular appliance, and the better it represents this appliance in action—the gas range, for instance, the stronger it will appeal to the housewife. In such case I will say from my experience that the thing to do would be to inclose a circular in a personal letter if need be; this, however, weakens the personal letter. That is taking into consideration only the use of one medium, the personal letter, and that, of course, to my mind, is absolutely out of the question. Now, so far as using a certain sum of money to accomplish a definite result is concerned, there is no doubt that the newspapers will reach more people, and, therefore, dollar for dollar, accomplishes the best results. If you take the old formula which advertising men used, the circulation times the number of words of each paper times the number of insertions, times the unit of space—and by unit of space I mean the smallest amount of space that can be grasped by the eye, in one "eyeful" you might call it; of course, that unit depends on the medium you are using; but if you multiply all those together you get the number of opportunities you have. Of course, that is a great deal better in the newspaper, because they have developed means of reaching the reader, and that is the best means. Of course, accompanying that result is a thing which every gas company has to consider, and that is the effect of going into the newspapers; the gas companies cannot afford to stay out of them; but I do not think a gas company can afford to cling to one means of advertising. Of course, this mail advertising business and experience of the Milwaukee Gas Light Company must be counted successful, for it has a corps of solicitors in the field, which, of course, is by far the best means of getting the business. The solicitors turn in prospect lists based on very definite information, and on those you can work with a minimum of effort. You know exactly each need, you know exactly what you are going after, and with such lists, without doubt, in our experience the personal mail campaign, as one gentleman here spoke about, brings the largest results.

The President—The last question on the list is No. 16.

> "Does it pay to advertise water heaters?"

Mr. Cowdery—I will start the ball rolling for you, Mr. President. The water heater, as actually used in the household for heating water required for domestic uses, will use as much gas in a year as the gas range; practically, a like amount. The water heater costs, installed, something less than $10, and the gas range considerably more. Therefore, it would seem to me there would be no question why it would not pay to advertise and direct the installation of water heaters, which cost you less money and bring you just as much.

Mr. Rutledge—There is no question that it pays to sell water heaters, because they use gas. At the same time I believe the revenue produced from a water heater is greatly overestimated. We have never been able in Milwaukee to determine definitely what that consumption is, but we know that after we have installed a water heater into a home the increase is quite nominal, and I question whether we have been able to discover that it would exceed an average of 6,000 cubic feet per year. The gas range certainly will consume a great deal more than that—I think the average is about 20,000—so we do not receive a revenue from a water heater as large as we would from a gas range. Another thing. I don't quite understand what Mr. Cowdery means by saying that it costs more to install a gas range. I think that is largely a question of how you are putting out your water heater and how the ranges.

Mr. Brown—I agree with Mr. Rutledge that the water heater consumption has been very largely overestimated. I do not agree with Mr. Cowdery in that particular, but I think perhaps he bases his figuring on the fact that the initial investment for the proportion of the service runs very low in most cases. The main and meters are in, and the water heater, if it is put out on such a basis that it will pay for its advertising, cost, delivery and connection, the capital charge against it is practically nothing, therefore, that it is a very much less expensive appliance to install than the gas range. In our case, with the prices which we are obliged to charge to cover these expenses, the water heater is not materially cheaper than the gas range, but that

part of it is for the consumer—of course, the consumer's costs are not a question of our costs—so that while the water heater consumption may be a very small part of the bill, at the same time we consider it a profitable appliance to install, because there is a very small capital charge in order to take care of it.

Mr. Roper—Can I give you the other side of the question? From the manufacturer's side of course it pays to sells water heaters, but I think so far you have all lost sight of one fact. Any number of gas ranges are in use—or would be in use if there were water; any number of places that they don't throw out the coal range for the simple reason that they want hot water, and when they have fire in the coal range so as to produce this hot water, even if it is only on Wednesdays and Saturdays, and the regular bathday, while that range is fired they are at the same time using it to do a certain amount of other work. The consequence is you are not getting the revenue from the range that you would derive if there was a water heater in the house, because if they were heating the water by gas they wouldn't have the coal range to do the baking, and you will find that the average woman is economical enough to say we have to fire the range for hot water; or, this is bathday, let us plan to bake the bread and cakes, and do all the baking for the next week, or for 2 weeks, according to the times they bake bread. [Laughter.]

Mr. Brown—That all sounds well, is good in theory, and probably could be followed up in many individual cases; but the point Mr. Rutledge brought out is that where we have had ranges in use for a number of years, and have subsequently added a water heater, there is very little increase in the revenue. That is practically a demonstration that the water heater does not add to the revenue materially.

Mr. Kelsey—Granted that the water heater is good, how would you push it? I have seen some gas companies advertise the water heater in the newspaper, and most every gas company knows every consumer, and by going into the newspaper you advertise to a great many non-consumers. Do you think that a person in this age who doesn't use gas for heating or cooking could ever be induced to take a bath? [Laughter.]

Mr. Walker—The advertising of water heaters pays, for the reason that I would as soon think of advertising tea kettles, and with a separate advertisement for the handle, as I would of sending out an advertisement for a range without combining an advertisement for water heater in some portion of it. The cost of adding that advertising for the water heater is simply the proportionate rate that the income of that water heater bears to the range, and I see no earthly reason why a range should be advertised without advertising the water heater. There is no additional expense per 1,000 if it is letters or circulars, there is no additional price per inch if it is newspaper advertising, and the two go as naturally together as the tea kettle and the handle, and, as I stated before, I think the cost of it is simply determined by the proportionate ratio of the income from the water heater and from the range.

The President—Anything further, gentlemen? This gets us to the bottom of the list, and Mr. Hyde says he has a question of his own to ask if you will give him an opportunity.

Mr. Hyde—Why does a gas range burn on the bottom and not bake, even though you turn the gas down to the lowest point?

The President—Mr. Roper.

Mr. Roper—I gave that question because of a letter that I received, and that is something that has not come up in years. It is one of the questions that I think is one of the fundamental principles, and that every solicitor, man or woman, ought to know how to answer. This special case is where a lady writes and says that her baking burns on the bottom, although she has turned it down to the lowest point. Now the fact is that baking will burn on the bottom when you burn too little gas quicker than it will when you burn too much gas, and that is the case here. If you do not give sufficient gas to heat the oven to bake so that it will circulate and brown the top your baking absorbs all the heat on the bottom and it burns, and there is not enough heat left to circulate around and come to the top and bake. That is a mistake that years ago was common, for the simple reason that in a coal or a wood stove the top of the oven is the hottest, the heat passing over the top of the oven, down the back and under the bottom and back over the top again, and the consequence is that in all coal and wood ranges the top of the oven is hottest. In the gas stove it is exactly the reverse, and the hottest part is on the bottom, and frequently they attempt to turn down the gas to prevent it from burning on the bottom, when they don't heat the oven sufficiently to begin with, and then don't burn gas enough to allow the heat to generate and come back and brown the top. With too much gas if you burn the bottom you will also burn the top. With too little gas you will burn the bottom and not bake the top, or even discolor it; if it happened to be bread it would still be white on top. That is the reason I brought that question up, because it is one that has not been brought up in years, and one of the things that, as I say, everybody ought to know.

A Letter.

The Secretary—I have a letter here from the Citizens' Business League, of Milwaukee, as follows:

Milwaukee, May 16, 1907.

Wisconsin Gas Association, in Annual Convention: Gentlemen—The Citizens' Business League notes with pleasure the return of your Association to this city for your annual convention, and we beg to express at this time the sincere hope that when you adjourn it will be with the decision to meet here again next year.

There is a constantly growing appreciation of the facilities which Milwaukee has to offer for the various State Associations in their annual convention, and we believe that your Association has fully demonstrated the wisdom of meeting in Milwaukee.

It is always a pleasure to Milwaukee people to welcome to the city the various associations which are part of the business activities of the State, and that welcome certainly includes the Wisconsin Gas Association. Yours truly,

Citizens' Business League, R. B. Watrous, Sec.

The President introduced Mr. George H. Cressler, of Fort Wayne, Ind., who read a paper entitled

THE DEVELOPMENT OF GASHOLDER CONSTRUCTION.

[For the text of the Cressler paper see Journal, June 3, p. 926.]

Discussion.

The President—Gentlemen, the paper by Mr. Cressler is before you for discussion. I will ask Col. Pratt to open the discussion.

Col. Pratt—I do not believe that I have very much to say in addition to what Mr. Cressler has said. The paper from a historical standpoint is certainly very interesting. It seems queer to my mind that the carelessness and possible ignorance that had been employed in the construction of holders resulted in so few being demolished or destroyed by high winds and storms. It may be of interest to some of the gentlemen to know that I was recently in San Francisco and there saw the results of the calamity that visited that city last year. I think some of the ideas and bad policies that the engineers formerly employed in their construction of holders, especially the columns thereof, have been dissipated by the last experience in that city. It is very interesting to note that Mr. E. C. Jones, whom most of you gentlemen know, has in many respects changed his ideas relative to holder construction, especially respecting the matter of framing, etc. It seems hard that one should have to go through such an experience to find this out. Possibly such a calamity would never visit that city again in the lifetime of man. There was a condition there that caused him, as he expressed himself, to change his opinion in many respects.

The President—Mr. Williamson; have you any suggestions?

Mr. Williamson—I don't know that I have anything to say. I was very much interested in listening to the paper, and in fact very much taken with it. I concur in what Mr. Pratt says, that it is strange we haven't had more calamities. In an experience not long ago down South, in a small town where I was sent to do some work, I was very anxious to get away that night. I worked very hard all day, and had just sat in to lunch as the gas went out. I asked the waiter what seemed to be the cause and he said: "That is nothing; that happens often." "How so?" I asked. "Well, they do something down to the gas works and it goes out occasionally." Having just come from there I thought possibly I had done something wrong, so I went back to the gas works. They had two small holders. I asked what was the matter that the gas went out in the hotel. "Did it go out in the depot, too?" he asked. [Laughter.] I said, "I don't know; what is the matter here?" He said, "Nothing wrong here." I asked, "Are the drips pumped?" "Yes; they were pumped." "Are you sending gas out of this holder now?" "No, I shut this off before I turned on the other." "Did you ever kill anybody?" "Only one man," he said! [Laughter.]

The President—I think that that story must have been forgotten by Mr. Williamson last night. [Laughter.] Has any other gentleman any questions to ask, suggestion or inquiry to make? If not, on behalf of the Association I tender to Mr. Cressler our sincere thanks for the very interesting paper presented for our consideration. [Applause.] Last evening we had under discussion Mr. Richards' paper on "Bench Fuel Economies," and we didn't quite finish with it. As I remember, Mr. Brown was to have time to look it over and make some remarks about it, and Mr. Fred. Bredel was to bring his books in German,

Italian, Greek and French, to quote statistics in opposition to the theories advanced by Mr. Richards. I see that possibly Mr. Bredel has not returned from his automobile ride last night at 12 or 1 o'clock; he is not here at any rate. I will call upon Mr. Brown to continue the discussion of the paper.

Mr. Brown—I do not think I have very much to say on this paper. I do not know what form the discussion took yesterday. Mr. Richards, I think, should be congratulated on having brought the subject out so clearly, for I think it is a subject which is of considerable interest to most of us. I do not think many of the members present knew anything about it before this paper was presented. I have had some experience with the handling of the economizing scheme, so-called. I do not know what was brought out in the discussion, but it probably was brought out that this was not a new scheme. It is a method of cooling the zone of combustion in a generator or producer, which was invented or patented by Siemens some 30-odd years ago; but evidently he either got tired of the development work, or, discouraged in some way, dropped it before he perfected it. It had been in use for a number of years in this country and under development by several different individuals in the last 10 years, but Mr. Doherty is the first man to apply it to bench work. I believe though some attempts were made in a New York plant at about the same time that Mr. Doherty was doing his experimental work. Certainly it is true that Mr. Doherty is the first one to get a successful application. I do not believe personally that Mr. Doherty has got the best application that can be made, and I do not want to discuss the question of his installation or the rights which his company has at all; but as far as results are concerned, there is no question but that we get a very much more economical cooling of the zone of combustion, and, therefore, freedom from clinkers, from this method than we could get by any method of cooling by water. It would seem, from Mr. Richards' figures, that they have not reached the fullest possible benefit in the use of this return flue gas scheme, and I question whether, from the way he states his problem, they understand just what limits the percentage of CO_2 in the mixture of return flue gas and air he is using to feed the combustion in the generator. At one of the largest plants in the country, where this scheme is being operated on somewhat different lines, we learn it is not a question of the temperature at which the clinker forms with any given grade of fuel at all that controls the percentage of CO_2 returned, but upon an entirely different balance of heat. The zone of combustion has heat added to it or subtracted from it in several ways. The sensible heat of the mixtures of products of combustion and air which are fed to the producer bring in heat. The endothermic action by the breaking down of the CO_2 takes away heat, and then we have a very heavy loss of heat by radiation from the walls of the generator. It simply resolves itself into this problem. To introduce as much CO_2 as possible and still maintain the temperature of the producer at such a point that you can burn enough fuel to maintain your heat in the bench. In one type of furnace that has been determined to be somewhere between 12 and 14 per cent., and it is not affected in any degree by the nature of the fuel. In any case where an excess of 8 or 9 per cent. CO_2 is returned there is no trouble with clinkers; that is, on any fuel I have experimented with. There might be fuels that would require a greater proportion in order to do the cooling work, but the economy is increased up to the point where the cooling effect of the endothermic reaction plus the radiation from the producer and from the generator is sufficient to reduce the fuel combustion per square foot of grate area to a point where not enough fuel is actually burned to keep up the heat in the bench, and when you get to the point where an increase of the volume of the return products does not increase the heat of the bench, you have reached your possible limit. I think that the weakest point in this system of return is the loss of efficiency due to the method of returning the fuel gas mixture to the furnace. They have a very highly efficient air inspirator, but it is still a long way short of 100 per cent. The small appliances used for compressing this air are necessarily very inefficient, and the three machines (the steam engine, blower and inspirator) make the final efficiency very low. In addition to that I judge, from the temperatures mentioned here and those which I have heard from other plants equipped in the same way, that they get the return flue mixture back to the producer at a very much lower temperature than if it were handled direct with a fan. This I know is being done in other cases where the temperature is almost double that mentioned by Mr. Richards. So while it may seem surprising to some of the members that such a great saving in fuel could be made, I would say, if Mr. Richards' figures are exact as to the saving, perhaps a 20 per cent. saving is possibly ahead for them.

The President—Gentlemen, this concludes all the papers and discussions, so far as we know, and I desire to have the Association tender to Mr. Richards the thanks of the Association for his paper on a subject that is of such general interest, and which has brought out such an interesting discussion before this meeting. I have here the

REPORT OF THE COMMITTEE ON PLACE OF NEXT MEETING.

Your Committee on Place of Next Meeting respectfully recommends that the next annual meeting of the Wisconsin Gas Association be held in the city of Milwaukee.

M. T. WALKER,
ROBERT YOUNG,
B. D. VILES,
} Committee.

On motion of Mr. Pratt the report of the Committee was adopted. The following

REPORT OF COMMITTEE ON NOMINATIONS

was read and adopted:

Mr. Wortendyke—Your Committee on Nominations begs to report as follows:

For President—Mr. Edward Daniell.
For Vice-President—Mr. S. J. Glass.
For Secretary and Treasurer—Mr. H. H. Hyde.

The President—Gentlemen, you have heard the report of the Committee on Nominations. Those who favor the adoption of the report of the Committee will say "Aye;" contrary, "No." The "Ayes" have it, and the officers nominated by the Committee are the officers of the Association for the ensuing year.

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS.

MILWAUKEE, May 18th, 1907.

This Committee hereby tenders its indorsement of the presidential address in general, and heartily commends in particular the attitude of the President with reference to the establishment of a State Commission for the regulation of gas companies and other public utilities.

We agree with the opinion conveyed that, in view of the present agitation against corporations, it is essential to the gas interests of this State to operate under the control of a fair-minded board of commissioners working under a general law authorizing the commission to specify the details of control, and bespeak the co-operation of the gas companies of the State to this end.

S. J. GLASS,
H. M. BUCK.
JULIUS LINSTED,
} Committee.

The President—I would inquire of Mr. Glass if he desires a meeting of the Legislative Committee, or has anything to bring before the Association in relation to legislative matters.

Mr. Glass—I don't know that I have anything special to bring before the Association. I think the new bill has been mailed to all the Companies. The managers have had an opportunity to read and study it, and they will need to study it still further before they know all there is in it. One suggestion that I would like to make is that the officials of the several Companies go over the bill very carefully with their counsel, and advise me as soon as they can of the objections they find or have to make to the bill. They should take it up in a broad way. If we are going to have public control of our properties we want sane, reasonable control, and any trifling objections that may be found in the bill as it is drawn should be overlooked; only bring out the points that are of great importance to the Companies and, in the interest of not only the Companies but the public, should be modified or cut out entirely. If they will give me the benefit of suggestions of that character they may have to offer we can put them all into the hands of our counsel, and at the proper time he will appear before the Legislature at Madison. I would also suggest that, at the time of the hearing when our counsel will appear, I would like to have the counsel and manager of the Companies, also any of the stockholders or directors who are good talkers, to give us the benefit of their presence. We want the committee to appreciate there are a great many people interested in this bill on our side of the question.

The President—Mr. Cowdery, have you any suggestions to make?

Mr. Cowdery—I think Mr. Glass has brought out practically all there is to say, Mr. Chairman.

The President—I think, gentlemen, the point made by Mr. Glass that we should (as many of us as possibly can) be present at these hearings, has a great deal of force, because the larger the crowd the greater the influence we may exert, even if only in numbers. Those who come will have to be prepared to stay until the hearing is pretty well over, or until the bill is almost ready to be finally disposed of, for if they come and go home things may happen that they don't think of. I hope to see before the committee having this public service bill in charge as many members of the gas fraternity in Wisconsin as can possibly come.

Gentlemen, the business of the Association having been about completed, I desire to return to the Association my thanks for the support and assistance given to me and the honor conferred in electing me as President. The Secretary reminds me that we have several new members who have not been voted on, have they?

The Secretary—It was understood yesterday that any new additions to the list of members should be considered as passed upon, but I will read those names now. [List of new names read by Secretary from report of Executive Committee.] This makes 20 new members altogether.

Mr. Williamson—It is a surprise to me to know that my name is there, and I want to thank the gentleman who put it on the list. I didn't think I could be admitted, not being a resident of the State, and it is a pleasure to listen to my name as a member of the Wisconsin Gas Association. I hope that I may always have the pleasure of attending the meetings and taking part in them. [Applause.]

The President—On behalf of the Association, I may say to Mr. Williamson that I believe I express the sentiment of the Association when I say that whenever distinguished gentlemen like Mr. Williamson come within the jurisdiction of Milwaukee, and the Wisconsin Gas Association is in session, it is his duty, and the Association considers itself honored, by electing him a member of the same. [Applause.]

VOTES OF THANKS.

Col. Pratt—I have some appreciation of the duties of presiding officer of such an Association for I know something of the work that is placed upon officials of an Association like this, and while there is usually compensation sufficient to satisfy most anyone from the attendance upon such meetings as these, and the papers and discussions that are engaged in, still I always feel a little better if I receive from those assembled the thanks of the Association. Therefore, I move that the thanks of this Association be extended to the President, the Secretary and Treasurer, and any others who may have assisted them in the arrangements and the conduct of the affairs of this Association, and that such thanks be expressed by rising vote.

The President—Will you kindly put the vote, owing to the modesty of the officers.

[Motion put to a vote by Mr. Pratt, and carried unanimously.]

Mr. Pratt—Mr. President, the officers have the unanimous thanks of the Association.

President Corscot and Secretary Hyde returned thanks to the members of the Association for their vote of appreciation.

The President then declared the sessions of the Wisconsin Gas Association for the year 1907 adjourned *sine die*.

Government Tests for Explosives Used in Coal Mining.

The United States Geological Survey within a few weeks will establish, probably in the Pittsburgh district, an experiment station for the purpose of testing explosives used in coal mining, the ultimate object being, if possible, a reduction in the number of mine disasters resulting from gas and coal dust explosions. Miners' safety lamps will also be tested at this station, and explosive investigations conducted both in the laboratory and in the mines.

The station will consist of an explosive gallery, rescue room, observation house, lamp testing rooms and explosives' laboratory. This gallery is to be made of boiler plate and will be in the form of a cylinder, 100 feet long and 6 feet in diameter. A series of safety valves on hinges will be arranged along the top to allow the escape of gas following an explosion. Portholes along the sides, covered with ½-inch plate glass, will allow those in the observation house to see whether an explosion has taken place in the gallery during the tests. The cylinder will be filled with firedamp and air, or coal dust and air, and the explosives will be hurled into the gallery by means of a steel mortar fired by electricity from an observation house 60 feet away. The firedamp and air will be thoroughly mixed by an electrical fan.

All explosives, if used in large quantities, will ignite firedamp or coal dust. Tests will be made with various explosives and the maximum quantity of each explosive that can safely be used in mines will be published under the head of "Permissible Explosives." Explosives known as "safety explosives," in which the temperature at the point of detonation is low and the flame of short duration, will have a higher "limit charge" than the less safe explosives. The rescue room will resemble the interior of a mine and during tests will be filled with smoke. The efficiency of all apparatus for sustaining life will be determined by a series of tests.. Miners will be shown how to rescue their fellow miners.

The observation house will run parallel with the explosive gallery 60 feet away and will give opportunity for a number of persons to witness the tests in safety.

All safety lamps that are now used in this country will be tested, not only for their candle power but also for their relative safety in the presence of firedamp. The lamps, which will be tested in a separate room, will be subject to different velocities of explosive mixtures of gas and at various angles.

All explosives will be first tried by the pendulum test and the Trauzl test, to arrive at the quantity to be used in making experiments in order to get the same disruptive force.

The pendulum or English test consists of a large pendulum weighing several tons which swings backward when the force of an explosive is exerted upon its face and the distance of the swing is indicated by a delicate sliding rule. The explosive is fired from a mortar and the force of the explosion is played against the face of the pendulum.

The Trauzl test consists of a cylindrical lead-block 20 c. m. high and 20 c. m. diameter. The weighed explosive with the electrical detonator is placed in this central cavity and tamped with a known quantity of sand and moist clay. After the charge has been exploded the pear-shaped expansion of the bore is measured by filling it with distilled water at 16° C.

A pressure gauge will be used for measuring the actual pressure in pounds per square inch developed by the detonation of various explosives. The analysis of the products of combustion will also be made. The heat of decomposition of all explosives in terms of calories will be ascertained by detonating large quantities in a bomb. The explosives will be fired from the mortar at night and the length of the flame will be determined by photography. The time of the flame will also be determined by an electrical apparatus. The rate of detonation will be determined by an electrical, rotary, recording drum.

Actual experiments will be made in mines to lessen the waste of fuel in mining operations. Several of the best explosives which have been determined by the results at the testing station will be purchased in the open market. They will be used in different mines and the amounts of lump and slack coal produced will be carefully screened and weighed. A classification of these explosives will be made in reference to the cost of explosive per ton of coal produced. Different methods of using explosives in mines will be investigated with special reference to increasing safety and efficiency.

The experiments will be under the direction of Mr. Joseph A. Holmes, Chief of the Technologic Branch of the Geological Survey. Dr. Charles E. Munroe has technical supervision of the tests which will be conducted at the station. Mr. Clarence Hall, Explosives Expert for the Geological Survey, assisted by Mr. W. O. Snelling, will have immediate charge of the experiments. Mr. Hall has recently returned from Europe where he made a study of the foreign government testing stations.

The Woodall-Duckham Vertical Retort Settings.

At the last meeting of the Southern District Association of Gas Engineers and Managers, which was held in Bournemouth, England, the last week in May, a feature of the doings was an inspection of the Woodall-Duckham vertical retort system, a notable working example of which is there installed. The Engineer and Manager of the plant (Mr. W. H. Woodall) was this year President of the Association, and it was at his invitation, and under his guidance, that the inspection visit was made. The story of the visit is here reprinted from the *Journal of Gas Lighting*, issued the 4th inst.:

The visit was expected to be one of exceptional interest. The expectation was fulfilled, for the visitors were privileged to witness that continuous carbonization in closed vessels is now an accomplished fact. In other words, they saw in actual work the continuously charging and discharging vertical retorts on which the President, in conjunction with Mr. A. M. Duckham, has been working assiduously for some 4 years; and what the visitors witnessed—accustomed as they are to the smoke, dirt, and intermittent operations of an ordinary retort house—was something worth going far for. The 2 settings of 4's at the Bourne Valley works represent the latest construction there; but new experience since their erection has pointed the way to certain further improvement. Nevertheless the results at present secured, as will be shown, promise much. What has now to be done, as soon as settings are at work elsewhere, is to demonstrate the commercial advantages of continuous working in comparison with ordinary systems, and we are hoping, though the way has been long to the present stage—long be-

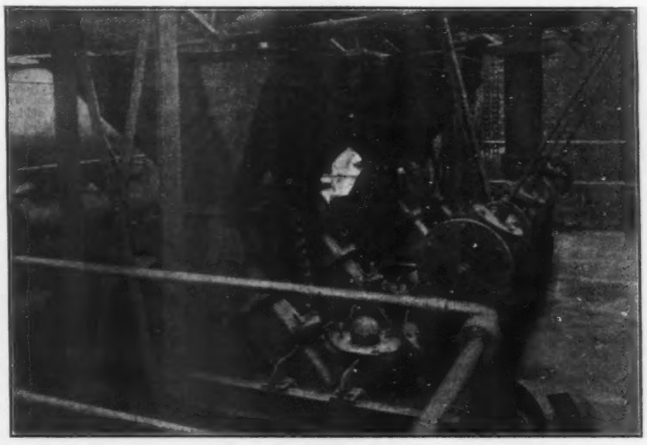
cause of the virgin soil that has had to be worked upon to attain the end in view—that the commercial advantages of the system will soon be conclusively proved. In the course of this article we shall be giving some figures which show fairly (as we have seen from an examination of the hourly and daily working records) the results from the present settings.

Impressions.—It would have been of great interest to have gathered the individual impressions of the numerous professional inspectors of the settings and working on Thursday last. It was strange to see the large, square, brick erections, destitute of mouthpieces and all the heavy mountings that custom has associated with the retort house; strange to think that within each setting there were 4 retorts 25 feet long in which the carbonization of coal was proceeding, controlled entirely by the governable rate at which the spent portions of the charges were being systematically removed at the bottom of the retorts; strange, knowing this, to be able to detect no smoke, flame, dirt, steam; to see no rushing about of men; to hear nothing of the noise inseparable from ordinary retort house operations; to see no charging and discharging machinery moving up and down the house; to find only a couple of men on the installation—one at the top of the bench whose heaviest labor is that of "watching the wheels go round," and keeping things clean and lubricated as the attendant would do in an engine house, and the other man engaged at the bottom wheeling away the coke, as the retort conveyors deliver it into barrows (inasmuch as a transporting conveyor is not yet of the equipment to receive delivery of the coke); and to learn that these men could, given a conveyor to remove the coke, easily, and have a lot of time to spare, keep an eye on, and give all the attention necessary for a plant making a million cubic feet of gas a day——well, the most conservative among us must devoutly hope that continuous carbonization will prove, and that quickly, a great commercial success. With such plant, if it demonstrates its general superiority over the ordinary carbonizing methods, an engineer and his staff could in a labor emergency preserve a town from being entirely deprived of gas. But that is not all. We look for the ascension pipes; and the celebrated chapter on "Snakes in Ireland" comes at once to mind, for we might with truth say "there are none." The hydraulic main with all its dirt and difficulty has disappeared, as also the dip-pipes. What need is there of them when no doors are ever opened, and the whole operation is carried out in sealed vessels? There is about a 2 foot 6 inches of connecting pipe (including the valve) running slantwise at the top of the retort. But nothing more. Stopped pipes are, under this system, things of the past. That is the experience of the last four years, during about three-quarters of which time vertical retorts, in various stages of development, have been working, and during the whole of that time on no single occasion has there been such a thing as a stopped pipe. The setting of 4 that preceded the present settings was making gas and supplying into the town for 11 months; and there were no stopped pipes. What is also of great importance suffering gas managers will concede, is that naphthaline has not been traced, and there are no naphthaline troubles. Money now spent on clearing ascension pipes; money now spent in connection with the naphthaline difficulty, and any other difference produced by the new as compared with the old systems, must be entered in the balance sheet in determining the commercial value of continuous carbonization.

Early Work at Bornemouth—Difficulties Met to be Overcome.—A great deal has been made of the reticence of Messrs. Woodall and Duckham in giving information up to the present about their process of continuous carbonization in vertical retorts. We are not apologists for them; they do not need any. The process is their own; and it has been others and not themselves who during the developing and the probationary period have talked of the system and of its prospects. Let it be remembered that they attacked a many sided problem—one that had never been attacked on the same lines before; and they had to feel their way. It was a question of designing, first, the component parts of what they believed would work, and then to amalgamate them to make a working entity.

Every part of the plant, every operation, must have, in such a system, an interdependence; and as working proceeded, every part of the plant and every operation had to be little by little modified, or be entirely discarded and replaced, until the properly organized system, with each part indispensable to, and working smoothly with, the others was secured. It meant much doing and undoing, for it was indeed a knotty and complicated problem that these intrepid investigators set out to solve.

Let us go back in history a bit, and by illustration just lift one corner of the curtain to show what has had to be done, without entering into details. The first vertical retort put up at the Bournemouth works in 1903 was a single one, 10 feet long. This retort never really worked, owing to difficulties in heating. The next retort was a single vertical one, 20 feet long, and this was worked for a period of practically 12 months, with, from the figures we have seen, extraordinary results in make but of rather low illuminating power—about 10 candles. But there were other drawbacks. The retorts to this stage were all water sealed at the bottoms. They led up to the first setting of 4 vertical retorts. In this case the retorts terminated in a common hopper and common conveyor at the bottom.



View on Top of the Two Beds of Four 25 Feet Woodall-Duckham Vertical Retorts at Bournemouth, Showing the Coal Hoppers, the Feeding Rolls, the Bifurcated Shoots to the Retorts, etc.

The coke was extracted by this conveyor, and the rate of carbonization was controlled by the speed at which the conveyor was run, which was about 18 feet per hour. The chief trouble experienced with this setting was the lack of positive control of each separate retort, and the fact that—the rate of carbonization being dependent on the rate at which the conveyor was run—it was impossible to remove the coke through the water seal at a sufficient pace to prevent undue quenching. The coke, in fact, was under the water for some 20 minutes. We are enabled to give drawings which show first the old arrangement, and secondly the means adopted in the present settings to overcome the troubles.

Bottom Regulation the Controlling Factor—The Question of Coke Quenching.—Perhaps it would be well here to impress upon readers this fundamental principle affecting the working of the Bournemouth verticals—that the whole of the regulation of charging and discharging the retorts, and the duration of carbonization, is effected at the bottom of the retorts. In other words, the rate of discharge regulates the feed, and, therefore, the rate of passage of the charge through the retorts. If this is borne in mind, much else will be readily understood as we proceed.

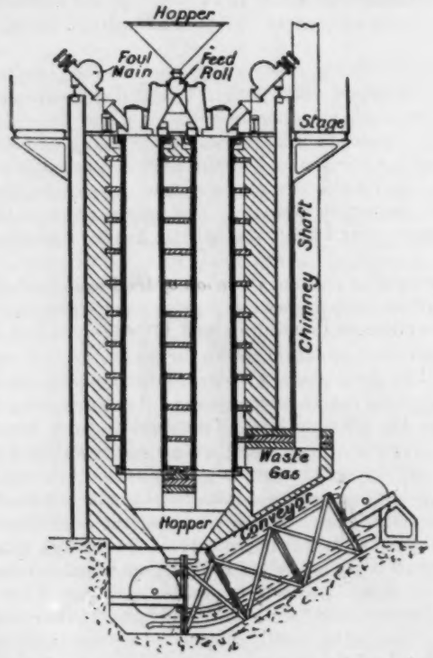
Now, in the existing settings, there is a special pushing device under each retort, which insures a positive feed to each retort entirely independent of the others in that setting, and an entirely independent conveyor is also provided under the retorts for the removal of the coke as it is discharged by the pushers, which can be run at any desired speed, without affecting the rate of carbonization. The conveyors gave a little trouble at first; but the right kind, of the right strength, has now been determined. However, it is the special pushing device that is the determining factor in insuring continuous carbonization. The questions of coal and coke conveying are quite extraneous to the process under discussion, the success of which is dependent on the combination of the coke discharging device and the special coal feed, which together insure that the retort is always full of coal and coke, and yet the charge never jams. By these latter-day means, the necessity for which has taken time to discover, and then to devise and perfect, the coke can also be extracted without being unduly quenched—in fact, observation confirms the statement of the inventors that the coke by the present arrangement is not under the water for more than about 10 seconds—from the time it goes into and is clear of the water. Indeed, most of the coke is now so hot on being delivered from the conveyor that it cannot be held in the hands. This is our experience, and it at once disposes of the questions that have been raised as to the deterioration of the coke through a too long subjecting to water, and as to the large proportion of water that the coke contained under the cruder conditions

of earlier experiments. There was undoubtedly some ground for the opinions at one time entertained on this score, and opinions that became somewhat exaggerated while the inventors were at work rectifying the difficulty. But now, as we say, the coke is so hot that the moisture in it due to its brief immersion is rapidly dissipated. Comparison of the drawings will show the changes in the construction of the conveyor and in its course that have produced this result.

The Settings and Operations in Further Detail.—Now that we have disposed of the point as to the control of the feed at the top of the retorts depending upon the operations at the bottom of the retort, and of the associated one as to the rapid passage of the coke through the quenching water, we may glance at the setting a little more in detail, and the drawing of the setting as it is to-day, but which has still to undergo certain further improving modification (the results not being up to the point the inventors have confidence they will attain), will materially aid the reader in comprehending the features to which attention will be directed.

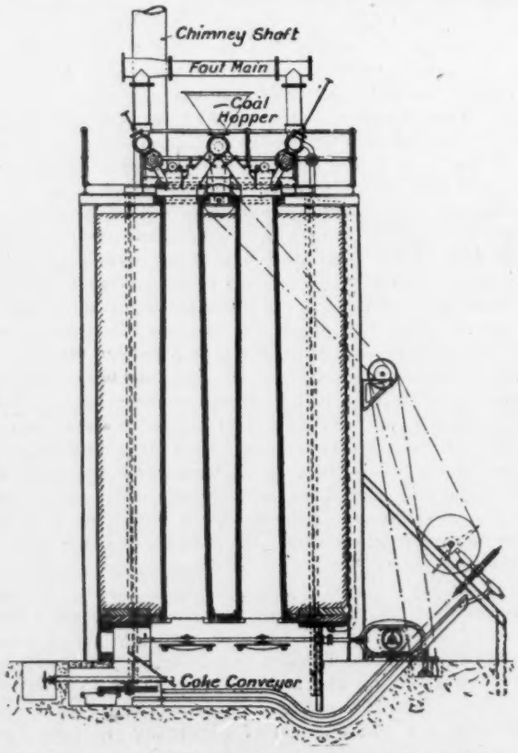
As already mentioned, in the two settings at the Bourne Valley works, the retorts are arranged four in a setting. They are 25 feet long, with a sectional area of 24 inches by 10 inches at the top, and 30 inches by 22 inches at the bottom, the thickness of the wall of the retort being 3 inches. The charge in each retort rests on a cast iron plate, on which the pusher works. The pusher, it is incidentally worthy of note, is hollow and is cooled by water. Each pair of pushers is worked tandem by a special reciprocating device—a double rack and half pinion, clearly shown at the bottom of the second drawing. As the pusher goes in the half pinion gears with the top rack and pushes it in. When the pusher gets to the end of its stroke the pinion disengages from the top rack, and a very small portion of a revolution causes it to engage in the bottom rack, and the return stroke is commenced. The working was watched and greater precision of action could not be desired. The pinion itself makes only 1 revolution an hour, and when this is being done 2 tons of coal per retort is being carbonized in the 24 hours. But Messrs. Woodall & Duckham are aiming at 3 tons per retort, and they are sanguine they are going to do it on the completion of certain adjustments which they have arranged to effect in the setting.

The Feeding Arrangement.—It has been made quite clear that the whole operation of the retorts is controlled by the pushing device, because, as the pushers discharge the coke from the supporting plates, the charge settles in the retort, leaving a space at the top, which is immediately filled with coal by an automatic rotary charging device. This



Cross Section of First Setting of Four Retorts Erected on the Woodall-Duckham System.

device is a cylindrical vessel working in a drum, and it has upon the periphery of its body one opening through which the coal is received from the feeding hopper above, and out of which the coal, as space allows, is fed into the retorts. It is very interesting to watch the action of one of these feeding devices and its reception of coal from the hopper, after making a discharge into one or other of the two retorts which each feeder serves through a bifurcated shoot. The coal in the hopper is in alternate states of quiescence and movement—the merest trickle—into the cylindrical feeder. Yet with the almost imperceptible motion, no less than 4 tons of coal passes—not by any guesswork but by actual weighing—through one of these feeding devices per 24 hours, each retort, as has been said, dealing with 2 tons each per day. The feeder, by the way, has a capacity of about 30 pounds, and it makes 12 revolutions a minute—feeding not 30 pounds, but small quantities, dependent on



Cross Section of Present Setting of 4 Retorts on the Woodall-Duckham System.

the space available, into each retort on an average 6 times a minute. The feeding device is driven off the same shaft as the coke pushers at the bottom of the retorts, so that the pushers take out exactly the same quantity of coke from each setting, and the space left is immediately filled with coal by the feeder. But, as remarked, fresh coal cannot be put in until coke is removed, and the charge has settled, and space provided at the top; but there is always the coal in the revolving device ready to drop, as opportunity offers. In this way no undue pressure can be brought to bear on the retorts, and there can be no jamming of the charges.

Miscellaneous Details.—While on top of these 25 feet length retorts, two or three other points were noticed. One was that, practically in the center of the top cover of each retort, a hole has been made into which a large iron ball fits, through the center of which ball a hole has been drilled. When the ball is lying in its bed with the hole through it in a horizontal position, a perfect seal is made against gas egress or air ingress, and, by turning the ball so that the hole is in a vertical position, the attendant can, with the aid of a rod, feel exactly the position of the charge, without losing gas or drawing in air. There are no hydraulic mains, or (as we have previously shown) nothing that can be called ascension pipes or dip-pipes; the reason for the absence of them being, of course, obvious—there being no doors to open, the retorts being self-contained, and the operations entirely mechanically controlled. If constant conditions in retorts are necessary to efficient carbonization, then here we have conditions which are unvariable from hour-to-hour throughout the day. Once set to work, the retorts simply go on working. There is nothing to do and practically nothing to touch; and what the inventors have had to prove, first, was that they could, working as it were automatically, get the charge down regularly, the spent coke removed regularly, and fresh coal fed in regularly. This they have succeeded in doing, and thus we have, at any rate, attained continuous carbonization. The results are a distinct matter.

The Space Occupied—No Retort House Required.—Space in relation to output is an important consideration. The brickwork of the setting of 4 retorts 25 feet high, each dealing with 2 tons (and it is hoped shortly

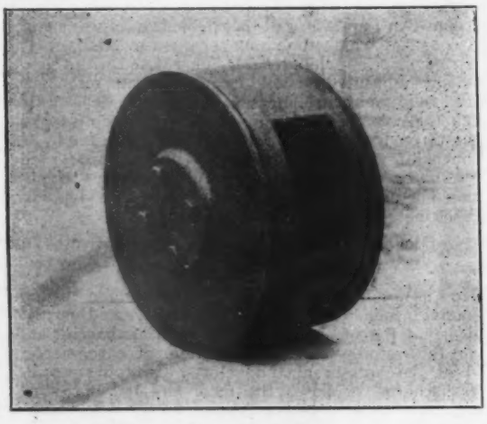
3 tons) of coal per 24 hours, occupies an area of 9 feet by 15 feet. In front, about 15 feet is required by the conveyors and for attention to them, so that the ground area required is 9 feet by 30 feet for each setting of 4 retorts. It should be noted in this connection that it is claimed for this system of working—there being no lids or doors to open—that no retort house is required. As a matter of fact, the setting that is under slow fire at the present time at the Linacre works of the Liverpool Gas Company is out of doors, while that at the Nine Elms station of the Gas Light and Coke Company is in a house.

If it is proved that retort settings on this principle need no habitation, but nothing more than an erection over them to shield the attendants from weather inclemency, and to protect the coal in the hoppers from rain, there is capital expenditure to be saved here. In this connection, we have an interesting photograph looking down on the top of the Linacre setting during construction.

Fuel Account.—The fuel account we gathered has been down to as low as 15 per cent. of the coal carbonized,

The Labor Account.—Working on these two settings, the carbonizing wages have been reduced to under 2 cents per 1,000 cubic feet, and working properly with a number of settings—say 5, of 4 verticals each—equal to the attention of the men now engaged watching the retorts automatically doing their work, carbonizing wages could, it is believed, be brought down to something like ½ cent per 1,000 cubic feet.

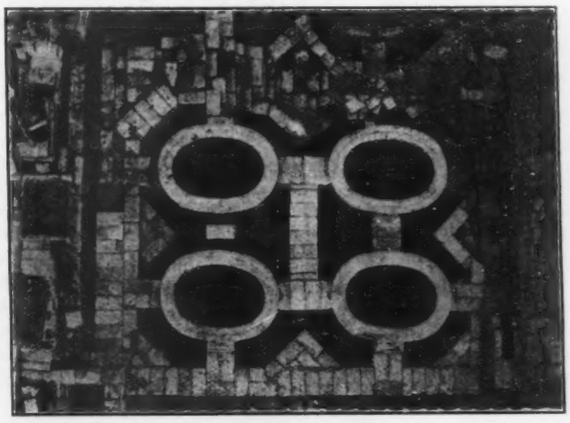
The Power Required.—The power required for operating the system is almost ridiculously small. Standing on the top of the benches, and watching the smooth, quiet and easy movement of the charging devices, and then going below to inspect the working of the conveying plant, it is patent that very little power is needed to drive the whole plant. An installation to make ½ million cubic feet of gas a day would not require more than 5-horse power to drive all the moving plant, and in this installation at Bournemouth not more than 3-horse power is being used—including the driving of the feeding arrangement and the coke conveyor.



The Cylindrical Charging Device, which Automatically Receives from the Hopper and Ejects into a Pair of Retorts as Space Permits.

Character of the Coke.—The coke as now produced from the retorts is clean, hard and of silvery appearance—in fact, it is decidedly good to look upon. But, so strong does custom root itself, that at first the color not being the same as of old, consumers temporarily thought there was just cause and reason for complaint. But this was only a transient matter; and now the vertical retort coke is taken readily. The hardness of the coke will be easily understood when it is remembered that before it is removed from the bottom of a retort, it has had the weight of a gradually increasing column of charge upon it until the full length of 25 feet has been reached.

The Results.—We next give the results of the working with the settings of retorts as at present standing; but it will be borne in mind by readers that Messrs. Woodall and Duckham have certain ideas materially shaping themselves which they are convinced are going to result in a substantial gain in the results. There was one thing upon which we were able to satisfy ourselves—not that we the least doubted the honesty of Messrs. Woodall and Duckham (far be that from anyone's mind), but because it is useful to be able to make attestation to this effect—and that was their independence in the matter of the working records, daily and weekly, which were inspected. We found the coal that was being used was being taken from by not any means recently stocked coal in the yard; and the men were weighing and bagging it before elevating it to the hoppers on top of the bench. The vertical retort attendants take the readings of the meters; and their readings are checked by the works' foreman. The men also weigh up the coke used for fuel, and record the vacuum at which the retorts are working. At the far end of the works, the works' chemist and his staff take the illuminating power of the gas, the calorific readings, and make their analyses of the gas. They also keep the records of the tar and liquor made. Before, however, the gas is tested in any way, it passes through a condenser all round the retort house, an 18 inch condenser on the retort house wall, through the washers and scrubbers put in for 1,500,000 cubic feet per diem, a set of 25 feet square oxide purifiers, and about ¼ of a mile of 24 inch main. It is then metered in a station meter (1,500,000 cubic feet capacity); and the various tests for composition, illuminating power, and calorific value are then made. The figures, in fact, are the ordinary works' readings of ordinary working, and nothing more; but the illuminating power is taken every hour by the "Metropolitan" (Carpenter) No. 2 burner, with the carbonic acid left in the gas, once an hour day and night; and the calorific power is registered twice an hour. The figures, however, are only submitted for their passing interest, and not as final. The present settings were first put to work on May 6.



The Camera Turned on Top of the Woodall-Duckham Vertical Retorts During Construction at the Linacre Gas Works, Liverpool.

Average Working Results for the 22 days up to May 27.

Cubic Feet of Gas, Per Ton.	B.T.U.	Illuminating Power, Candles.
13,021	546	14.20

A Run of Good Daily Makes under Present Conditions.

	Cubic Feet.	B.Th.U.	Candle Power.
May 11	13,502	546	15.06
" 12	13,916	540	13.29
" 13	13,918	540	14.80
" 14	13,835	532	14.37
" 15	12,906	556	15.27

Composition of the Gas.

	Per Cent.
CO_2	1.8
Hydrocarbons absorbable by bromine	3.6
CO	8.2
CH_4	23.8
H	54.8
Residue estimated as nitrogen	7.8
	100.0

Specific gravity, .46.

There is no naphthaline; and only a small trace of cyanogen present in the gas.

16.7 gallons of tar were made per ton (sp. gr. 1.075)

42.3 gallons of 8-ounce liquor were made per ton.

From these figures readers can, bearing in mind that they are not to be taken as final, make their own deductions.

Regarding the composition of the gas, it is very satisfactory to note that, on the 3 weeks' working, the average of carbonic acid is only 1.8 per cent. Another interesting point is the "residue estimated as nitrogen." It is very high. In previous tests, this has been as low as 2.8 per cent. But testing for the composition of gas is a very delicate operation; and the particular test given to us was made in the Company's own laboratory. It is probable, therefore, that the 7.8 per cent. includes a certain amount of undecomposed hydrogen and methane.

The test was merely handed to us because it contained the only actual figures obtained on the settings now in operation; but it would not be correct to assume from them that there is 1.8 per cent. of carbonic acid and 7.8 per cent. of nitrogen—equal to 9.6 per cent. of inert gases—present. With respect to naphthaline, by the most delicate test that the investigators have been able to apply, they have never yet been able to obtain a trace of it. So far as cyanogen is concerned, they have only been able to obtain a trace, and have never realized a sufficient quantity to measure. The reason attributed by Messrs. Woodall and Duckham for there being neither naphthaline nor (in measurable quantity) cyanogen present in the gas is that the coal is subjected to a process of fractional decomposition—each fraction coming over at its own critical temperature, and never having to pass through any temperature higher than that at which it is evolved. This explains the difference in the quality of the tar—the tar not having been subjected to any decomposing action. It is a very light brown tar, and contains a larger percentage of lighter oils than ordinary tar; and its consistency is about that of water gas tar. It can be returned (this is a very simple matter) to the retorts, and is then decomposed; so that the make of tar is in the hands of the engineer. In the case of the experimental single retort setting, the tar was returned, in a very easy way, and yielded satisfactory results—an increased make of 1,500 to 2,000 cubic feet of gas per ton of coal being the result.

This completes the information that we have at present to give regarding the Woodall-Duckham continuous process of carbonizing coals to the point that practice has carried it. Research has taken it, it is believed, farther still; but the rights of the inventors have very properly to be observed. How much better results they will be able to give us in the future, only actual working can reveal. Then the whole balance sheet on a financial basis, taking a hypothetical case if the inventors like, should be worked out in comparison with the best of ordinary systems. For new systems must stand or fall on a thorough commercial valuation. We are hopeful of the future, from what has been seen and from the achievements set forth above. With us, all will concede that Messrs. Woodall and Duckham have proved the feasibility of continuous carbonization, and that their invasion of the regions of research has given much of great technical interest and value.

The Unison Telemetric Pressure Gauge.

Fig. 1.

The Connelly Iron Sponge and Governor Company, Mr. S. F. Hayward, President, is putting on the market an excellent device for indicating gas pressures at a distance, which is the invention of Mr. James S. Kennedy, Engineer of the Standard Division or Branch of the Consolidated Gas Company, of this city. This apparatus is well outside the line of experimentation, good working examples of it having been operated continuously for some months in large and trying districts of the gas service in this city.

Fig. 3.

The apparatus consists of a transmitter (Figs. 1 and 2) and an indicator, Fig. 3. The transmitter is located and connected with the street main at some point in the distributing system where it is desired to maintain a constant pressure, and where it is considered that uniformity of pressure will be of the best advantage to the balance of the district. A wire connection is fixed between the transmitter at such point and the governor station or initial point of gas supply, the indicator (Fig. 3) being here connected in the circuit within view of the attendant. A suitable form of closed circuit battery (usually of the

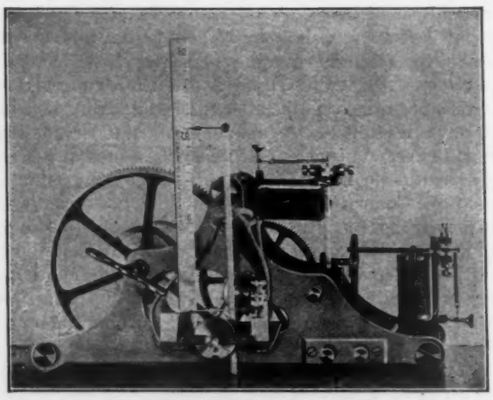


Fig. 2.

gravity cell type) is connected in series with the circuit and may be placed anywhere on the line at either end. The indicator will always denote the pressure existing at the transmitter, every variation being instantly reproduced. By means of a test key a verification of the indications can be made at any time in the simplest and most convincing manner.

The transmitter consists of an electro-mechanical device, solidly constructed and handsomely finished, which rests in a glass case placed on a cabinet. A small tank, containing water and carrying a float of well-known construction, is placed inside the cabinet and is connected by piping to the street main. The variations in pressure are communicated to the machine by means of a light rack attached to the float causing the machine to operate the distant indicator to work in unison with the pressure conditions. The machine is actuated by a weight, which should be wound up every day, although at the best one winding would carry for 48 hours.

The indicator is simple in movement and in construction, and is entirely automatic. A pointer, mounted over a graduated dial, indicates the pressure in unison with the transmitter. The illustration (Fig. 3) shows a dial graduated from 15 to 29-tenths of an inch water column pressure, but the latest form is graduated from 10 to 29-tenths, and the device rests in a handsome nickel case. When the pressure changes the indicator operates with a click that can be easily heard 30 yards away. More than one indicator may be used on the same line, all operating in unison with the transmitter and without interfering with each other.

A single electrical circuit is all that is necessary for the operating of the device. It may be a metallic or double circuit, or in the nature of a ground wire and return. It is not desirable, however, to use a grounded circuit where the line is in close proximity to other circuits, such as power and light on the same poles. Any suitable form of closed-circuit battery may be employed. The ordinary gravity cells, when properly installed, require very little attention and will last several months on one charging. The current consumption is very low, being from 50 to 75 milliamperes.

New York's Public Utilities Law.

The Public Utilities bill which has been under so much discussion in New York, and throughout the country generally, has been passed over the veto of Mayor McClellan, of New York city, by the State Legislature and has been signed by the Governor. It becomes active almost immediately, and in view of its extraordinary interest, the time has arrived to give a synopsis of its contents, and the full details of the sections relating to electric light and power corporations. The law is an instrument of great verbosity and length, and would occupy several pages of this JOURNAL if printed in extenso.

The measure abolishes the State Railroad Commission, the State Gas and Electric Light Commission and the Rapid Transit Board of New York city and creates in their places two commissions of five members each, who shall have jurisdiction over the public service corporations of the State. The State is divided into two districts. The first district includes the entire city of Greater New York, and to it one of the commissions will devote its entire attention. The second district will comprise the rest of the State. The commissioners for both districts are to be appointed by the Governor with the consent of the Senate. He may also remove them after a trial on charges for inefficiency, neglect of duty or misconduct in office. The salary of each commissioner is fixed at $15,000 a year, the total for the ten being $150,000 annually. Each

commissioner is also empowered to appoint counsel at $10,000 a year and a secretary at $6,000 a year.

The jurisdiction of the commission in the first district extends to any common carrier operating or doing business within the limits of New York city, to the manufacture and sale of gas and electricity, and in addition it shall exercise all the power of the Rapid Transit Commission conferred upon it since the passage of the act creating that body in 1891. The second district commission will have similar powers in the rest of the State, including the regulation and control of all transportation of persons and property by public service corporations. The expenses of the first district, except the salaries of the commissioners, counsel and secretary, are provided for in the same manner as the Rapid Transit Commission, and the salaries and expenses of the commission in the second district are made a charge on the State.

The term of one commissioner in each district is fixed to expire on February 1, 1909, and the term of one commissioner in each district expires annually after that. Successors are appointed for full terms of 5 years. To the commissions is given the power to subpœna witnesses and administer oaths. Any witness who refuses to obey the subpœna or to answer the questions put to him is guilty of a misdemeanor. But any witness who testifies is immune from prosecution for any penalty or forfeiture concerning an act as to which he testifies, but this immunity does not extend to any corporation.

The utilities law prescribes the duties of the transportation companies, including the railroads, street railroads, express companies, car companies, sleeping car companies, freight companies, freight line companies, and pipe line companies and of gas and electric companies, and gives the commission power to regulate the operation of such companies.

The telephone and telegraph companies are not included within the scope of the commissions' power.

The law provides that the franchise of a public corporation shall not be transferred, assigned or leased without the permission of the commission having jurisdiction. Each commission is empowered within its jurisdiction to fix the form of accounts and reports of the public service corporations, to investigate accidents, to fix just and reasonable rates, to order adequate service as to cars, motive power, time schedules, safety devices, employees and other instrumentalities. Its orders are to be inforced until modified or abrogated by the commission or unless declared by a court of adequate jurisdiction to be unauthorized by this or any other act, or to be in contradiction of the Constitution of the United States.

Penalties ranging from $1,000 to $5,000 are imposed upon public service corporations violating the act or failing to obey any order of the commission. Shippers violating the act are also liable to a penalty. The act will take effect 30 days after it shall have become a law. Any person injured by the failure of a public service corporation to comply with an order of the commission may bring an action for damages and if successful is to be allowed to get a reasonable attorney's fee to be fixed by the Court.

Article 4 follows giving the sections and provisions relative to electrical and gas corporations and the regulation of gas and electricity prices:

Section 65. *Application of Article.*—This article shall apply to the manufacture and furnishing of gas for light, heat or power and the furnishing of natural gas for light, heat or power, and the generation, furnishing and transmission of electricity for light, heat or power.

Section 66. *General Powers of Commissions in Respect to Gas and Electricity.*—Each commission shall within its jurisdiction:

1. Have the general supervision of all persons and corporations having authority under any general or special law or under any charter or franchise to lay down, erect or maintain wires, pipes, conduits, ducts or other fixtures in, over or under the streets, highways and public places of any municipality, for the purpose of furnishing or distributing gas or of furnishing or transmitting electricity for light, heat or power, or maintaining underground conduits or ducts for electrical conductors.

2. Investigate and ascertain, from time to time, the quality of gas supplied by persons, corporations and municipalities; examine the methods employed by such persons, corporations and municipalities in manufacturing and supplying gas or electricity for light, heat or power, and in transmitting the same, and have power to order such improvements as will best promote the public interest, preserve the public health and protect those using such gas or electricity and those employed in the manufacture and distribution thereof, or in the maintenance and operation of the works, wires, poles, lines, conduits, ducts and systems maintained in connection therewith.

3. Have power to fix the standard of illuminating power and purity of gas, not less than that prescribed by law, to be manufactured or sold by persons, corporations or municipalities for lighting, heating or power purposes, and to prescribe methods of regulation of the electric supply system as to the use for incandescent lighting and fix the initial efficiency of incandescent lamps furnished by the persons, corporations or municipalities generating and selling electricity for lighting, and by order to require the gas so manufactured or sold to equal the standard so fixed by it, and to establish the regulations as to pressure at which gas shall be delivered. For the purpose of determining whether the gas sold by such persons, corporations or municipalities for lighting, heating or power purposes conforms to the standard of illuminating power and purity and, of its own motion, examine and investigate the methods employed in manufacturing, delivering and supplying the gas so sold, and shall have access through its members or persons employed and authorized by it to make such examinations and investigations to all parts of the manufacturing plants owned, used or operated for the manufacture or distribution of gas by any such person, corporation or municipality. Any employee or agent of the commission who divulges any fact or information which may come to his knowledge during the course of any such inspection or examination, except in so far as he may be directed by the commission, or by a court or judge thereof, or authorized by law, shall be guilty of a misdemeanor.

4. Have power, in its discretion, to prescribe uniform methods of keeping accounts, records and books, to be observed by the persons, corporations and municipalities engaged in the manufacture, sale and distribution of gas and electricity for light, heat or power.

5. Examine all persons, corporations and municipalities under its supervision, keep informed as to the methods employed by them in the transaction of their business and see that their property is maintained and operated for the security and accommodation of the public and in compliance with the provisions of law and of their franchises and charters.

6. Require every person and corporation under its supervision to submit to it an annual report, verified by the oath of the president, treasurer or general manager thereof, showing in detail (1) the amount of its authorized capital stock and the amount thereof issued and outstanding; (2) the amount of its bonded indebtedness and the amount of its bonds and other forms of evidence of indebtedness issued and outstanding; (3) its receipts and expenditures during the preceding year; (4) the amount paid as dividends upon its stock and as interest upon its bonds; (5) the name of, and the amount paid as salary to each officer and the amount paid as wages to its employees; (6) the location of its plant or plants and system, with a full description of its property and franchises, stating in detail how each franchise stated to be owned was acquired, and (7) such other facts pertaining to the operation and maintenance of the plant and system, and the affairs of such person or corporation as may be required by the commission. Such report shall be in the form, cover the period and be submitted at the time prescribed by the commission. The commission may, from time to time, make changes and additions in such forms, giving to the persons, corporations and municipalities 6 months' notice before the time fixed by the commission as the expiration of the fiscal year of any changes or additions which would require any alteration in the method or form of keeping their accounts for the ensuing year. When any such report is defective or believed to be erroneous, the commission shall notify the person, corporation or municipality making such report to amend the same within 30 days. Any such person or corporation or municipality which shall neglect to make any such report within the time specified by the commission, or which shall fail to correct any such report within 30 days after notice, shall be liable to a penalty of $100, and an additional penalty of $100 for each day after the prescribed time for which it shall neglect to file or correct the same, to be sued for in the name of the people of the State of New York. The amount recovered in any such action shall be paid into the State treasury and be credited to the general fund. The commission may extend the time herein limited for cause shown.

7. Require each municipality engaged in operating any works or system for the manufacture and supplying of gas or electricity to make an annual report to the commission, verified by the oath of the general manager or superintendent thereof, showing in detail (1) the amount of its authorized bonded indebtedness and the amount of its bonds and other forms of evidence of indebtedness issued and outstanding for lighting purposes; (2) its receipts and expenditures during the preceding year; (3) the amount paid as interest upon its bonds and upon other forms of evidence of indebtedness; (4) the name of and the amount paid to each person receiving a yearly or monthly salary, and the amount

paid as wages to employees; (5) the location of its plant and system with a full description of the property, and (6) such other facts pertaining to the operation and maintenance of the plant and system as may be required by the commission. Such report shall be in the form, cover the period and be submitted at the time prescribed by the commission.

8. Have power, either through its members or inspectors or employees duly authorized by it, to enter in or upon and to inspect the property buildings, plants, factories, power houses and offices of any such corporations, persons or municipalities.

9. Have power to examine the books and affairs of any such corporation, persons or municipalities, and to compel the production before it of books and papers pertaining to the affairs being investigated by it.

10. Have power, either as a commission or through its members to subpœna witnesses, take testimony and administer oaths to witnesses in any proceeding or examination instituted before it, or conducted by it in reference to any matter within its jurisdiction under this article.

Section 67. *Inspection of Gas and Electric Meters.*—1. Each commission shall appoint inspectors of gas and electric meters whose duty it shall be when required, to inspect, examine, prove and ascertain the accuracy of any and all gas meters used or intended to be used for measuring or ascertaining the quantity of illuminating or fuel gas or natural gas furnished by any gas corporation to or for the use of any person, and any and all electric meters used or intended to be used for measuring and ascertaining the quantity of electricity furnished for light, heat and power by any electrical corporation to or for the use of any person or persons, and when found to be or made to be correct the inspector shall stamp or mark all such meters and each of them with some suitable device, which device shall be recorded in the office of the Secretary of State.

2. No corporation or person shall furnish or put in use any gas meter which shall not have been inspected, proved and sealed, or any electric meter which shall not have been inspected, approved, stamped or marked by an inspector of the commission. Every gas and electrical corporation shall provide or keep in and upon its premises a suitable and proper apparatus to be approved and stamped or marked by the commission, for testing and proving the accuracy of gas and electric meters furnished for use by it, and by which apparatus every meter may and shall be tested, on the written request of the consumer to whom the same shall be furnished, and in his presence if he desires it.

If any consumer to whom a meter has been furnished shall request the commission in writing to inspect such meter, the commission shall have the same inspected and tested; if the same on being so tested shall be found to be 4 per cent. if an electric meter, or 2 per cent. if a gas meter, defective or incorrect to the prejudice of the consumer, the inspector shall order the gas or electrical corporation forthwith to remove the same and to place instead thereof a correct meter, and the expense of such inspection and test shall be borne by the corporation; if the same on being so tested shall be found to be correct the expense of such inspection and test shall be borne by the consumer. A uniform, reasonable charge shall be fixed by the commission for this service.

Section 68. *Approval of Incorporation and Franchises: Certificate.*—No gas corporation or electrical corporation incorporated under the laws of this or any other State shall begin construction or exercise any right or privilege under any franchise hereafter granted, or under any franchise heretofore granted but not heretofore actually exercised without first having obtained the permission and approval of the proper commission. Before such certificate shall be issued a certified copy of the charter of such corporation shall be filed in the office of the commission, together with a verified statement of the president and secretary of the corporation, showing that it has received the required consent of the proper municipal authorities. No municipality shall build, maintain and operate for other than municipal purposes any works or systems for the manufacture and supplying of gas or electricity for lighting purposes without a certificate of authority granted by the commission. If the certificate of authority is refused, no further proceedings shall be taken before the commission, but a new application may be made therefor after one year from the date of such refusal.

[To be Concluded.]

THE Albion (Mich.) Gas Light Company has filed a notice of its purpose to increase the capital stock from $75,000 to $100,000.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

IN connection with the article in this issue descriptive of the Woodall-Duckham system of vertical retort settings it seems proper to note that the Isbell-Porter Company, of New York and Newark, has secured the agency for the named apparatus in America.

WE are indebted to the Bristol Company, of Waterbury, Conn., for a copy of its Bulletin No. 57, which is given over to a description of its new Recording Voltmeter. A commendable feature of this particular instrument is that it is applicable for use on either direct or alternating current regardless of the rate of alternations. This instrument is furnished in either portable or switchboard form and is furnished in any range desired. To say that the workmanship is complete, the material durable and the effect handsome seems hardly necessary.

MR. C. W. MCCORMACK, representing the owners of the Evansville (Ind.) Gas and Electric Light Company, has proposed that the authorities of Henderson, Ky., lease their gas plant to the former for a term of 20 years, the lessees to pay an annual rental. The scheme, strange to say, does not meet with favor at the hands of the authorities, although it is readily susceptible of proof that the plant, as now operated, is being run at a loss.

THE draughting offices of the Western Gas Construction Company, of Fort Wayne, Ind., are now in complete working order in the cottage building opposite the works, purchased some time ago at the instance of Mr. Guldlin. One thing about Mr. Guldlin may be said that cannot be truthfully denied: He is always solicitous about the comfort of his men; and they appreciate it, too.

MR. EDWIN FAY HYLAND, member of the '07 engineering class of the University of Michigan, has been appointed Gas Inspector for Detroit by Mayor Thompson, under the new ordinance which became effective early this month.

A CORRESPONDENT in Sacramento, Cal., writing under date of the 9th inst., incloses the following: "The Goldfield (Nev.) Gas and Coke Company has been organized with a capital stock of $800,000, which issue has been fully subscribed. A site has been secured and the erection of the plant and the installation of the mains throughout the city, as well as Diamondfield and Columbia, will be commenced at once. It is estimated that the first cost of the plant when complete will involve the expenditure of about $400,000. The plant will be enlarged from time to time, and its capacity increased as the consumption of gas warrants. That Goldfield, one of the most cosmopolitan cities of its size in the United States, with a population of fully 20,000 inhabitants, and lacking but few of the modern conveniences of life, should be without gas, has long been a matter of comment among visitors and local residents. At last, capital, realizing the wonderful prosperity and present and future possibilities of the camp, has taken the project in hand, and announcement is made that Goldfield is to have a complete, modern and up-to-date gas plant, which will furnish gas at a reasonable rate for illuminating, heating, cooking and power purposes."

MESSRS. H. M. BYLLESBY & CO. have been retained as consulting and supervising engineers by the Mobile and Ohio Railroad Company for the rehabilitating and electrifying of its general repair shops at Whistler, Ala.

THE Pittsburgh (Pa.) Meter Company has opened a New York office with headquarters in the Singer Building, 149 Broadway—right in the business heart of the city. Mr. V. E. Arnold is in charge of it.

MR. OSCAR H. FOGG is becoming quite potent in the politics of Queens county, N. Y. All the gas men of New York, Kings, Queens, Nassau and Suffolk counties will rally under the Fogg banner, although we fear Suffolk would not be of much use in a pinch.

To hark back to the proposed company for Goldfield, Nev., it should have been said that Mr. A. K. Wheeler, formerly of Janesville, Wis., is the one most prominently identified with the movement.

THE Board of Directors of Streets and Sewers, of Wilmington, Del., have passed over the mayor's veto a franchise recently awarded by Wilmington Councils to the promoters of the Commercial Light, Heat

and Power Company to there construct and operate a gas works. The counsel for the Company is Senator Anthony Higgins, and some of those behind him have been known in the past to bellow loudly against encouragement for opposition gas works' schemers. It makes a difference, however, on whose lot the opposition outfit is to stake camp. Meanwhile, it is well for all hands to remember that the Messrs. Dobson are still on the job in Wilmington.

THE proposed deal for the transfer of the Shelbyville (Ind.) artificial gas plant to the Central Indiana Lighting Company has been declared off.

GOVERNOR HUGHES has signed the bill under which the State stipulates that hereafter the candle values of gas as supplied within its limits shall be: Coal gas, 16; coal and water gas, 18; water gas, 20.

AT a special election of the voters of Negaunee, Mich., the electors not only defeated the proposition of the Marquette County Gas and Electric Light Company to buy the municipal lighting plant for the sum of $35,000, and they also refused to authorize the Common Council to dispose of the plant, but they declined to sanction a bond issue for making improvements to the lighting system which are held to be absolutely necessary. Another special election will probably take place shortly and the bonding proposition once more submitted.

THE merging of all the railroad, gas and electric light properties of Toledo, O., has been completed by the taking over concern, which is known as the Toledo Railways and Light Company.

THE comparative statement of the earnings of the Tacoma (Wash.) Gas Light Company for the twelve months ended May 31 is as follows:

	1906.	1907.	Increase.
Gross earnings.....	$114,253.59	$156,015.85	$41,762.26
Operating expenses..	70,216.69	78,203.34	7,986.65
Net.....	$44,036.90	$77,812 51	$33,775.61

THE Mayor of Port Huron, Mich., expressed some surprise the other day when he was informed that the moneys paid into the city treasury by the Port Huron Gas Company, on franchise account, amounted to 7 cents on each 1,000 cubic feet sold.

THE new selling rate for Rochester, N. Y., of 95 cents per 1,000 cubic feet, takes effect the 1st prox.

MR. FRED. L. BOOK, who since 1896 has been prominent in the office force of the Woonsocket (R, I.) Gas Company, has resigned in order to become identified with the E. K. Ray estate.

MR. J. H. MARTIN, President of the Durham (N. C.) Light and Power Company, has assumed the active management thereof.

THE selling rate for all purposes in Canastota, N. Y., is to rule hereafter at $1.25 per 1,000 cubic feet.

THE Legislature of Connecticut has passed the bill incorporating the Stratford Gas Company. The incorporators include Messrs. C. E. Stagg, G. O. Lines, H. P. Stagg, F. S. Beardsley and F. L. Curtis, and it is specified that the initial capitalization shall be $10,000, with the right to increase the same to $100,000.

THE Oxy-Hydrogen Gas Company's plant in Wilmington, Del., was badly damaged by fire the night of the 16th inst.

J. LEON ALBERTSON, formerly in the employment of the Atlantic City (N. J.) Gas and Water Company, and who was recently convicted of the embezzlement of funds belonging to that corporation, was sentenced to 2 years imprisonment at Trenton.

THE Kansas-City-Mo. Gas Company has adopted the districting plan for the settlement of gas accounts. The city has been divided into three sections, and the settlement days in each are 10 days apart—viz., the 10th, 20th and 30th of each month.

IT is said that a gas plant for St. Petersburg, Fla., has been proposed, and that Messrs. J. G. Lewis, W. J. Stemmer and J. R. Miller are the proprietors. The place looks too small to support such an enterprise.

A CORRESPONDENT in Jacksonville, Fla., writing under date of the 9th inst., incloses the following: "The contemplated change in the management of the Citizens Gas Company of this city, is now an accomplished fact, Mr. H. B. Hoyt having assumed full management of the corporation the 1st inst. Mr. Hoyt came direct from Michigan City, Ind., where he was in charge of the gas company since 1903. He is a man of experience in the gas business, and he will promote the the best interests of the citizens of Jacksonville as well as those of the gas company. All the old force have been retained, and new men added, so that now he has a very capable corps of assistants to work with, and big things in the way of improvements and better service may be expected. The gas company has secured the services of Mr. James H. Walker, of Milwaukee, Wis., who will be in the city for the next 2 weeks, in the interests of the Company. Mr. Walker is a man of wide experience, being an inventor of numerous gas appliances, and the Company has been very fortunate to secure him. He intends to call on all the business men of the city who may be interested in gas for industrial purposes and explain to them how they may economize on their fuel bills. This is something that has never before been attempted here, and shows a desire on the part of the Gas Company to be very liberal in all their dealings with the public. Mr. Walker's visit will, no doubt, be beneficial not only to the Gas Company, but to the citizens of Jacksonville as well. In line with the liberal policy now being pursued by the Company comes the welcome news that the gas rate has been reduced from $2 to $1.50, gross, and from $1.50 net to $1.40 net, extending the time of discount 5 days. This means a gross reduction of 50 cents per 1,000 cubic feet, and a net reduction of 10 cents per 1,000 cubic feet, the last day of discount to be the 15th of the month, instead of the 10th, as heretofore. The price of gas ranges and appliances has also been reduced, and very liberal terms made for payments. The Gas Company expects by this means to bring the cost of appliances within reach of every family in Jacksonville, so that all may enjoy that most modern and up-to-date fuel, gas."

THE Milwaukee (Wis.) Gas Light Company has established a garage near its offices on Wisconsin street, near Jackson.

AT the annual meeting of the Home Gas Company, of San Bernardino, Cal., the following Directors were elected: H. E. Harris, A. M. Ham, W. D. Wagner, F. Foster and I. Benjamin.

THE following inclosure was received some days ago from Manchester, N. H.: "Mr. Walter G. Africa, in referring to gaseous matters in this city, said: Many Manchester people who had never deemed gas within their means are now having their homes equipped with piping and fixtures for illuminating, heating and cooking purposes. Few of the new structures in process of erection within the confines of the city are devoid of provisions for the introduction of gas. While it will still be some time before the Peoples Gas Light Company will recover from the loss entailed by its own action in reducing the price of gas and adopting a flat rate, the number of regular consumers is steadily increasing, giving promise of success in keeping with the most sanguine expectations of the directing officials of the corporation. A move on the part of the Peoples Gas Light Company that has met with warmest appreciation and approval on the part of its patrons is the discontinuance of the discount limit. In common with the clothing, drygoods and other trades affected by the unusually cool weather that has prevailed during the spring and early summer, the Peoples Gas Light Company has suffered to some extent, because people with fires in their kitchen ranges have felt no necessity for the installation of gas heaters and cooking devices. It seems improbable that recent weather conditions can continue into July. With the coming of a warm wave there will be an increased demand for gas ranges that can be operated in the cool places where cooking can be accomplished with comfort. The heating and cooking devices now operated by gas have become almost innumerable. This is also true of the lighting arrangements. The smallest gas stove costs 15 cents. It is suitable for the boudoir or the kitchen. It is especially fitted for the heating of a curling iron and can be utilized at the same time for boiling water, cooking cereals, poaching eggs or making fudge. Then there is the instantaneous water heater, the gas heated flatiron and dozens of other contrivances designed to render the housewife's duties less arduous. One of the latest devices in illuminating is the pneumatic gas lighter, operated by a push button."

PAULSBORO, N. J., has voted to build a gas plant, to be operated on municipal account.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
EDITORS.

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NOTIFICATION RESPECTING ADVERTISING.

Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:

New York—American News Co., 39 and 41 Chambers St.
Germany—Lemcke & Buechner, of New York.
England—Aug. Siegle, 30 Lime Street, London.

MONDAY, JUNE 24, 1907.

The Market for Gas Securities.

The local gas share market is absolutely lifeless. Consolidated is 116 to 121, and Brooklyn Union is 102 to 112. The situation certainly does not warrant such low quotations. Peoples, of Chicago, is again above the 90 mark, and Washington (D. C.) gas is 340 bid. That stock, on the pending readjustment of the capital, should go to 400.

An estate offers through us $5,000 five per cent. bonds on a good going Company in the West at a price equal to netting 5.80 per cent. The value of the security is absolute. Inquiries respecting the bonds may be addressed to the Editor of the JOURNAL.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

JUNE 24.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	116	121
Central Union Gas Co.—				
1st 5's, due 1927, J. & J.	3,000,000	1,000	101	104
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	..	105
Mutual	3,500,000	100	190	225
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	98	100
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	37	43
1st Mtg. Gold Bds. 5 p.c.	1,000,000	..	98	104
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	101	103
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	108	111
Con. 5's, due 1945, J. & J.	1,500,000	..	104	110
Standard	5,000,000	100	140	160
Preferred	5,000,000	100	155	175
1st Mtg. 5's, due 1930, M. & N	1,500,000	1,000	104	108
The Brooklyn Union	15,000,000	1,000	102	112
1st Con. 5's, due 1948, M. & N	15,000,000		107	..
Yonkers	299,650	500	130	..
Out-of-Town Companies.				
Bay State	50,000,000	50	¼	⅜
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	..	65
" 1st Mtg. 5's	500,000	1,000	95	100
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	9	10
" " Bonds, 5's	5,250,000	1,000	75	80
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	106¾
Cincinnati Gas and Electric Co.	29,500,000	100	98	99x
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	90	..
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	87	88
Preferred	3,036,500	100	107½	108
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	..	90
Mortgage, 6's	3,000,000	..	..	118
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	980,000	1,000	92	95
Bonds	75,000	..	..	100
Detroit City Gas Co.	5,000,000	50	..	50
" Prior Lien 5's	4,618,000	1,000	..	98
Detroit Gas Co., 5's	351,000	1,000	75	80
" Inc. 5's	15,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	39	40
Fort Wayne	2,000,000	..	..	..
" Bonds	2,000,000	..	55	..
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	..	110	112
Bonds, 5's	10,500,000	..	107½	108½
Indianapolis	2,000,000	..	60	70
" Bonds, 5's	2,650,000	..	104½	105
Jackson Gas Co.	250,000	50	82	..
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	..	05
Preferred	2,500,000	100	95	110
Bonds	10,000,000	1,000	104	104¼
Lafayette Gas Co., Ind.	1,000,000	100	..	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas & Elec. Co.				
" 1st Mtg. 6's	350,000	1,000	106	108¾
" 6 per cent. scrip, due 1910	100,000	25	26	51
Massachusetts Gas Companies of Boston	25,000,000	100	57	57¼
Preferred	25,000,000	100	83	83¼
Montreal, Canada	2,000,000	100	218	218¾
Nashville Gas Lt. Co.	1,000,000	100	110	..
Newark, N. J., Con. Gas Co.	5,000,000	..	56	58
Bonds, 6's	6,000,000	..	137	138
New Haven	2,000,000	25	200	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	90	90¼
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	30,100,000	1,000	..	..
" 2d "	2,500,000	1,000	104	..
Rochester Gas & Elec. Co.	2,150,000	50	88	..
Preferred	2,150,000	50	116	..
Consolidated 5's	2,000,000	..	104½	105¼
San Francisco, Cal.	15,800,000	100	..	..
St. Joseph Gas Co. 1st Mtg. 5's	751,000	1,000	92	..
St. Paul Gas Light Co	1,500,000	100	45	47
1st Mortgage 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112¾	115
General Mortgage, 5's	2,465,000	1,000	96¾	..
Syracuse, N. Y.	1,975,000	100	50	55
Bonds	2,647 000	1,000	102	..
Washington, D. C	2,600,000	20	340	345
First mortgage 6's	600,000	..	..	..
Western, Milwaukee	4,000,000	..	..	..
Wilmington, Del.	600,000	50	220	..

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DIVIDEND NOTICE.

OFFICE OF THE UNITED GAS IMPROVEMENT CO., N. W. CORNER BROAD AND ARCH STS., PHILADELPHIA, PA., June 12, 1907.

The Directors have this day declared a quarterly dividend of 2 per cent. (one dollar per share), payable July 15th, 1907, to stockholders of record at the close of business, June 29, 1907. Checks will be mailed.

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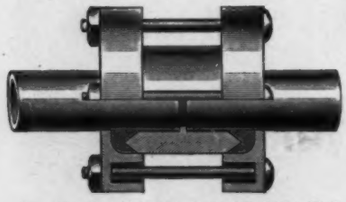
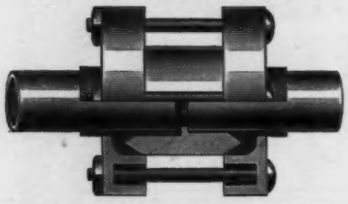
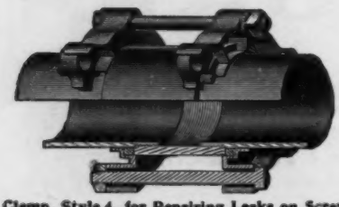
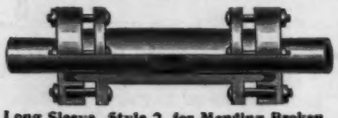

Regular Coupling, Style 1, for Plain End Wrought Iron Pipe.


Insulating Coupling, Style 5, for Plain End Wrought Iron Pipe,


Clamp, Style 4, for Repairing Leaks on Screw Collar.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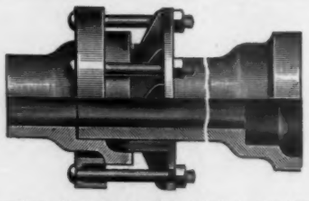
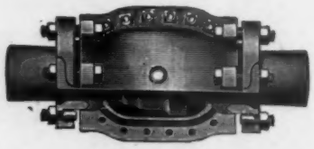
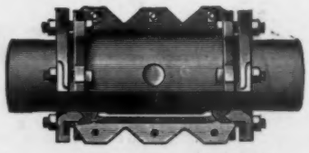
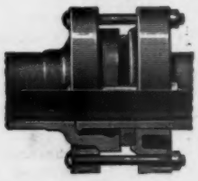
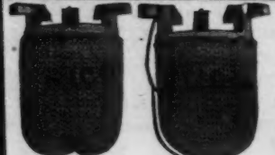

Coupling, Style 9, for Special Style Cast Iron Pipe.


Split Sleeve for Repairing Broken Bell or Cast Iron Pipe.


Split Sleeve for Repairing Broken or Cracked Cast Iron Pipe.


Clamp, Style 4½, for Repairing Leaky Lead or Cement Joints in Cast Iron Pipe.

Ramsdell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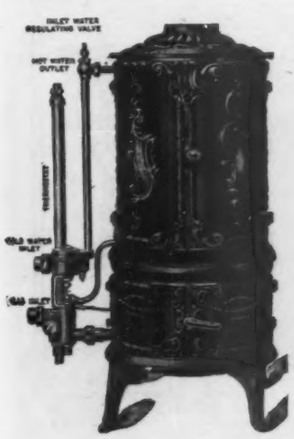

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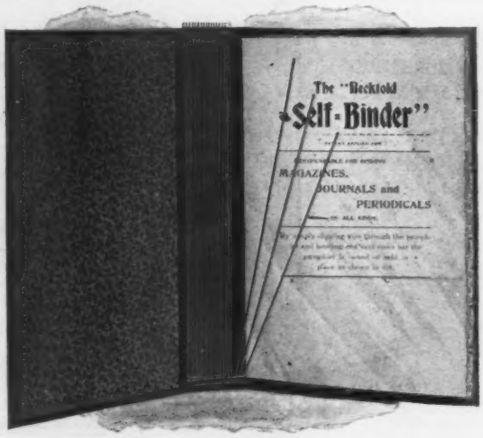

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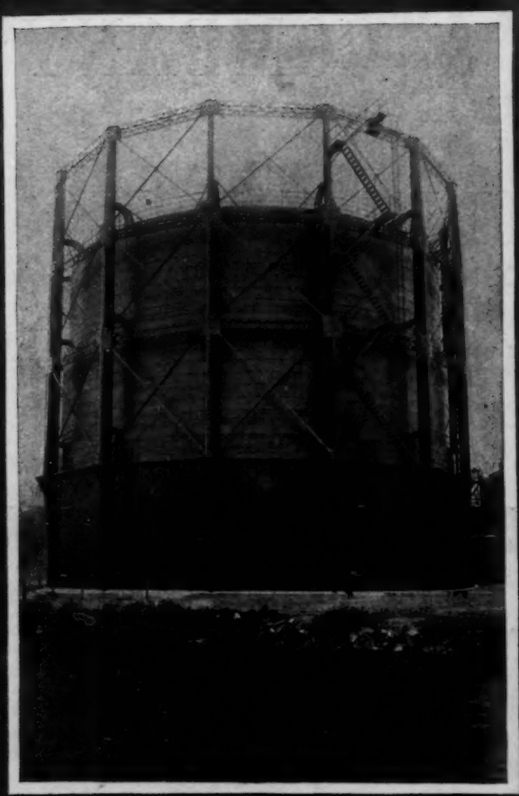

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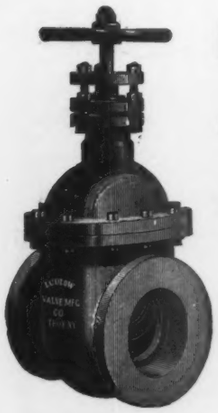

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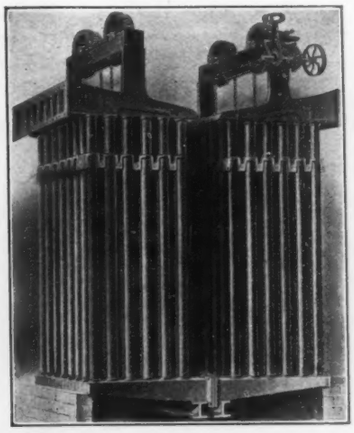

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DOUBLE and SINGLE DISTRICT STATIONS,

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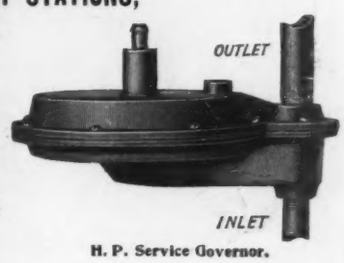

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THE ANSWER IS IN THREE WORDS:

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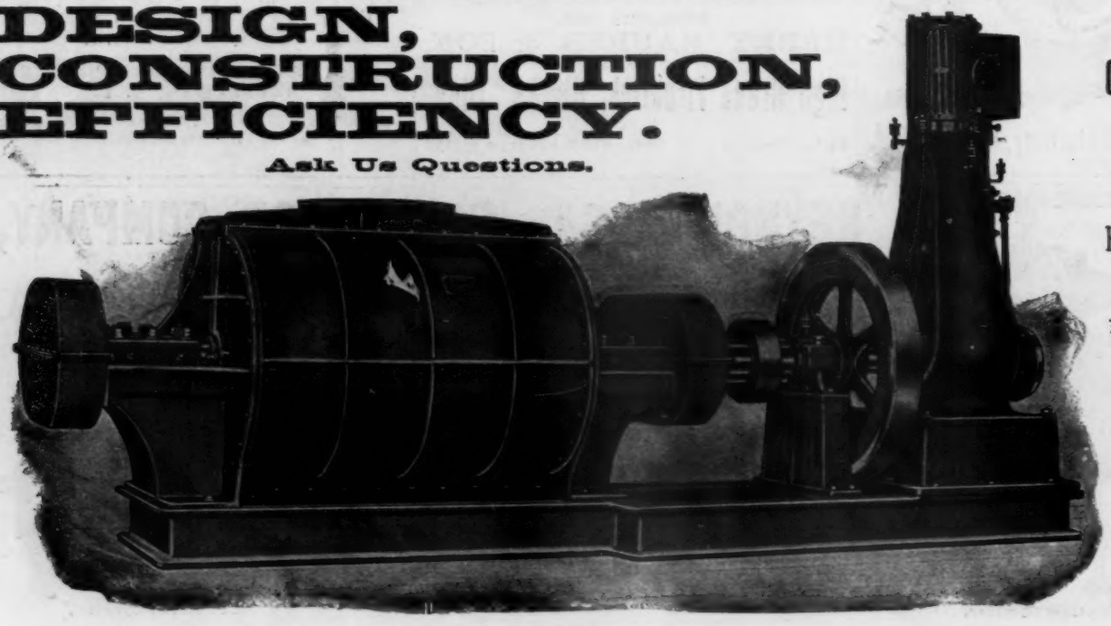

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Something Entirely New.

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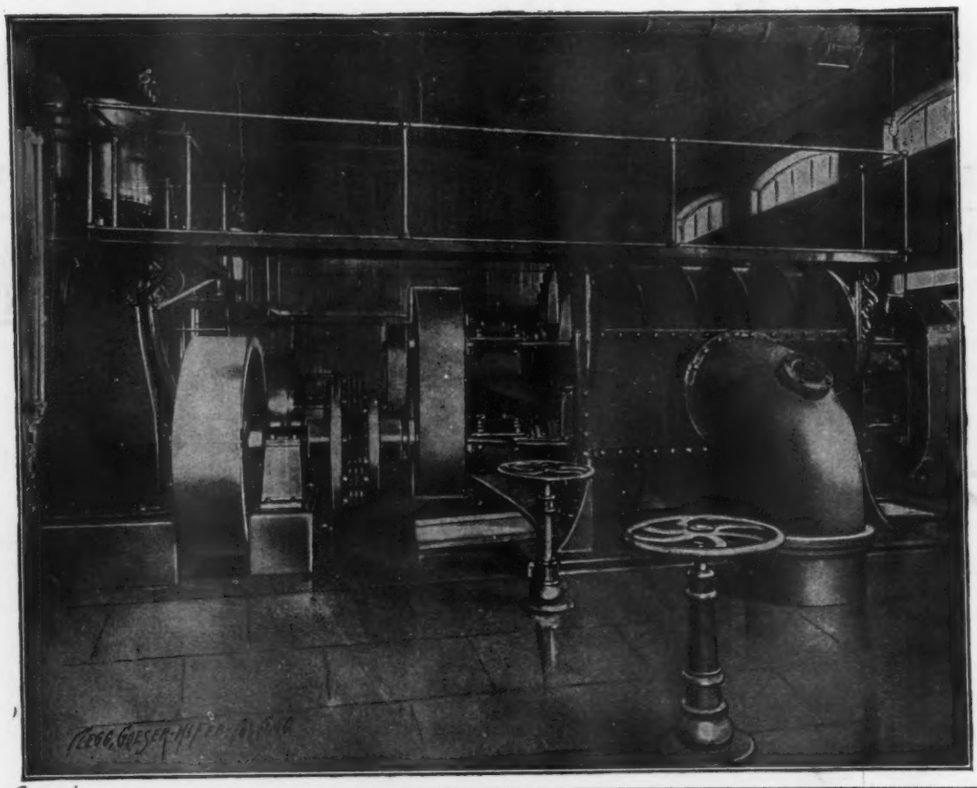

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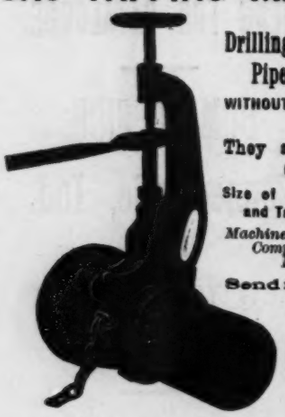

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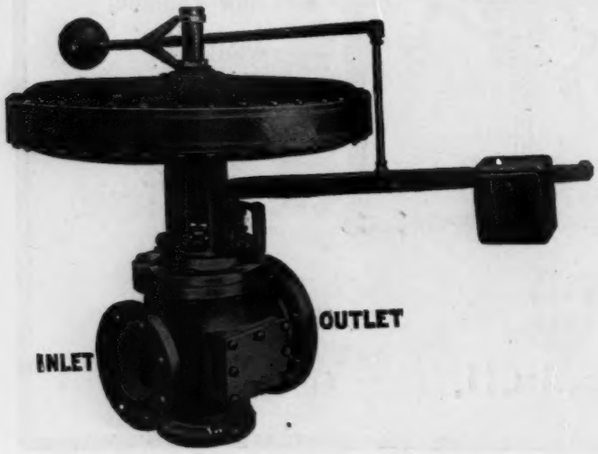

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AMERICAN METER CO.,

NEW YORK, ST. LOUIS, PHILADELPHIA, SAN FRANCISCO, CHICAGO,

Photometrical and Experimental Apparatus.

PUBLIC LIGHTING TABLE.

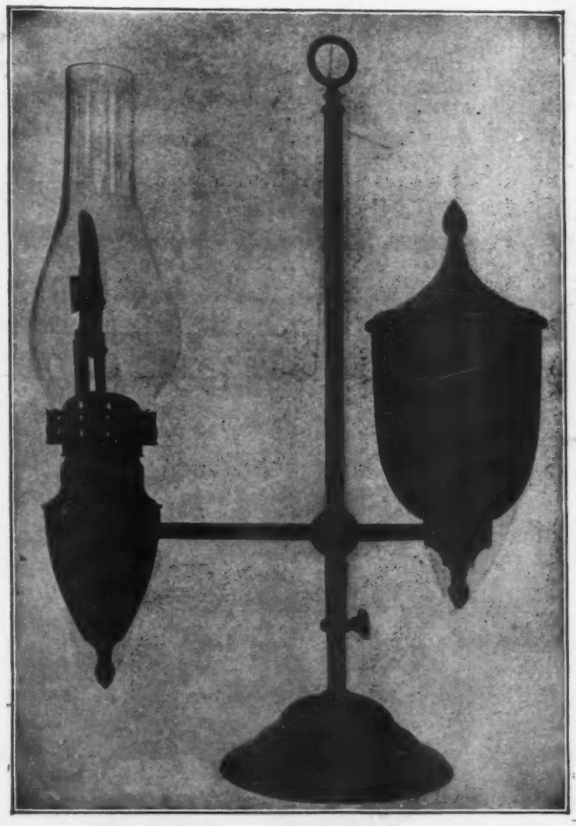
JULY, 1907.

Day of Week.	Table No. 1. FOLLOWING THE MOON. Date.	Light.	Extinguish.
Mon.	1	8.00 PM	1.00 AM
Tue.	2	8.00 LQ	1.30
Wed.	3	8.00	1.50
Thu.	4	8.00	2.20
Fri.	5	8.00	2.50
Sat.	6	8.00	3.30
Sun.	7	8.00	3.40
Mon.	8	8.00	3.40
Tue.	9	8.00	3.40
Wed.	10	8.00 NM	3.40
Thu.	11	8.00	3.40
Fri.	12	8.00	3.40
Sat.	13	8.00	3.40
Sun	14	8.00	3.40
Mon.	15	9.30	3.40
Tue.	16	10.00	3.40
Wed.	17	10.30	3.40
Thu.	18	11.00 FQ	3.40
Fri.	19	11.40	3.40
Sat.	20	12.10 AM	3.40
Sun.	21	1.00	3.50
Mon.	22	2.00	3.50
Tue.	23	No L.	No L.
Wed.	24	No L FM	No L.
Thu.	25	No L.	No L.
Fri.	26	7.50 PM	9.40 PM
Sat.	27	7.50	10.20
Sun.	28	7.50	10.50
Mon.	29	7.50	11.30
Tue.	30	7.50	12.00
Wed.	31	7.50 LQ	12.20 AM

TOTAL HOURS DURING 1907.

By Table No. 1.

	Hrs.Min.
January	211.10
February	193.40
March	182.10
April	167.00
May	157.00
June	145.30
July	151.50
August	162.30
September	175.30
October	202.40
November	209.30
December	231.50
Total, yr.	2190.20



THE ELLIOTT KEROSENE STANDARD PHOTOMETER LAMP.

***

10-Candle Power.

***

This lamp is a perfect substitute for the 10-candle Pentane Lamp hitherto used, and has the following advantages:

1st. It uses Standard Kerosene Oil (Pratt's Astral Oil or equivalent).

2d. It is remarkably steady. Will burn 24 hours continuously with less than 2 per cent. variation.

3d. It is much less dangerous than Pentane, which is a kind of gasolene.

4th. It is not easily affected by air currents in the photometer room.

5th. Since the lamp may burn continuously, the candle power of gas may be taken at any moment, if necessary. This insures steady illuminating power without waste of carburetting material.

6th. The first cost of the lamp brings it within the reach of even small gas works.

7th. Costs much less to maintain than a Pentane lamp or sperm candles doing the same service.

8th. Is not affected by the weather.

PUBLIC LIGHTING TABLE.

JULY, 1907.

Day of Week.	Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING. Date.	Light.	Extinguish.
		P. M.	A.M.
Mon.	1	7.30	3.15
Tue.	2	7.30	3.15
Wed.	3	7.30	3.15
Thu.	4	7.30	3.15
Fri.	5	7.30	3.15
Sat.	6	7.30	3.15
Sun.	7	7.30	3.15
Mon.	8	7.30	3.15
Tue.	9	7.30	3.15
Wed.	10	7.30	3.15
Thu.	11	7.30	3.15
Fri.	12	7.30	3.15
Sat.	13	7.30	3.15
Sun.	14	7.30	3.15
Mon.	15	7.30	3.15
Tue.	16	7.20	3.15
Wed.	17	7.20	3.15
Thu.	18	7.20	3.15
Fri.	19	7.20	3.15
Sat.	20	7.20	3.15
Sun.	21	7.20	3.15
Mon.	22	7.20	3.15
Tue.	23	7.20	3.15
Wed.	24	7.20	3.15
Thu.	25	7.20	3.15
Fri.	26	7.20	3.15
Sat.	27	7.20	3.15
Sun.	28	7.20	3.15
Mon.	29	7.20	3.15
Tue.	30	7.10	3.30
Wed.	31	7.10	3 30

TOTAL HOURS DURING 1907.

By Table No. 2.

	Hrs.Min.
January	423.20
February	355.25
March	355.35
April	298.50
May	264.50
June	234.25
July	243.45
August	280.25
September	321.15
October	374.30
November	401.40
December	433.45
Total, yr.	3987.45

NEW YORK, 318 West 42d Street. BOSTON, 820 Beacon Building. PHILADELPHIA, Broad and Arch Streets. ST. LOUIS, 712 Roe Building. CHICAGO, 218 La Salle Street. SAN FRANCISCO, 512 Oak Street.

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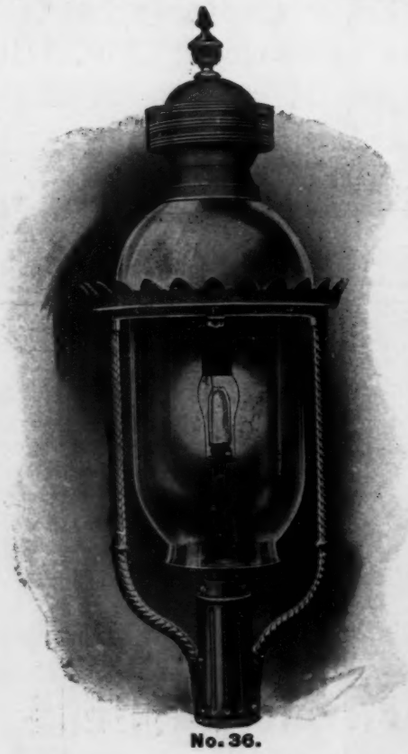
....OF AMERICA....



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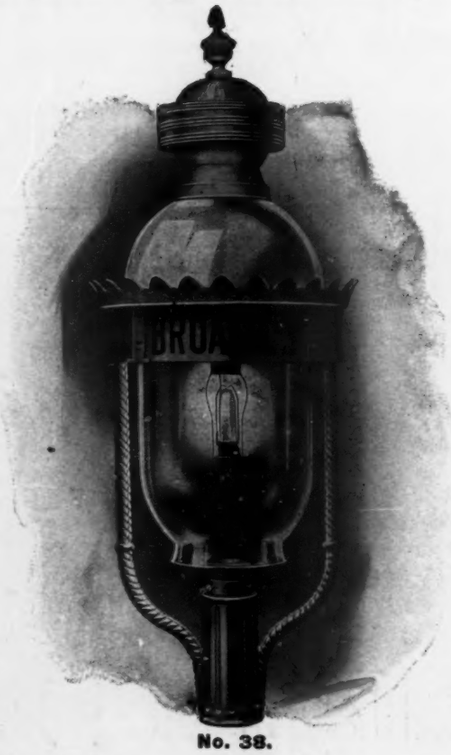

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Lowest Gas Consumption.
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Waterbury, Conn.
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Allentown, Pa.
Omaha, Neb.
Muskegon, Mich.
Nazareth, Pa. (2d contract).
Lewistown, Pa.
Greenville, Tex.
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Jefferson City, Mo.
Peekskill, N. Y. (2d contract).
Waterville, Me.
Washington, D. C. (4th contract).
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Hampton, Va.
Aurora, Ills. (2d contract).
Milwaukee, Wis.
Syracuse, N. Y. (2d contract).
Davenport, Ia.
S. Brooklyn, N. Y. (3d contract).
Delray, Mich.
Albert Lea, Minn. (2d contract).
Leominster, Mass. (2d contract).
Clinton, Mass.

TOTAL SETS INSTALLED IN 1906, ... 41
TOTAL SETS TO DATE, ... 634
TOTAL DAILY CAPACITY, ... 502,555,000 cu. ft.

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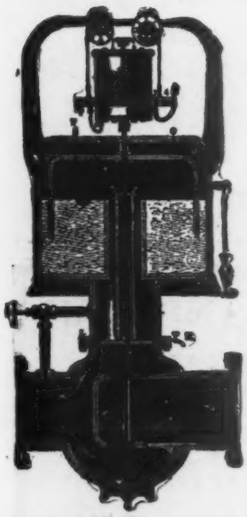

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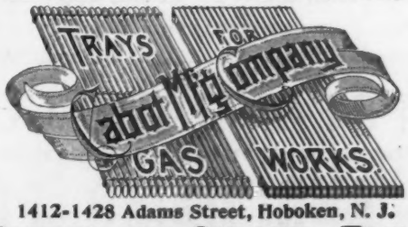

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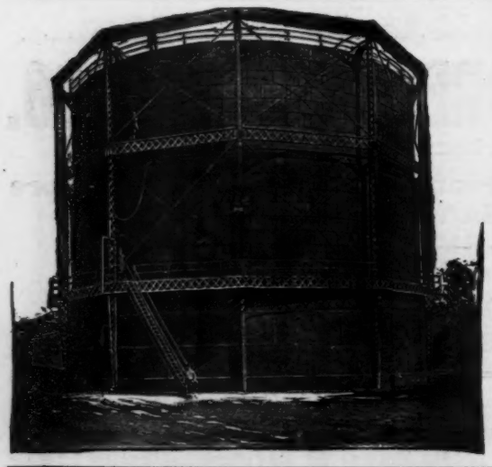

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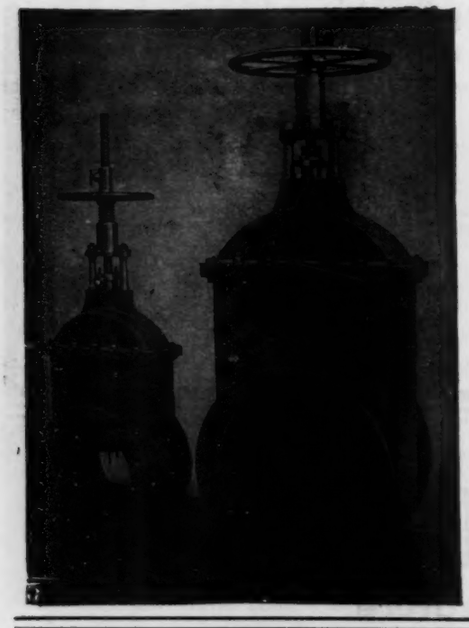

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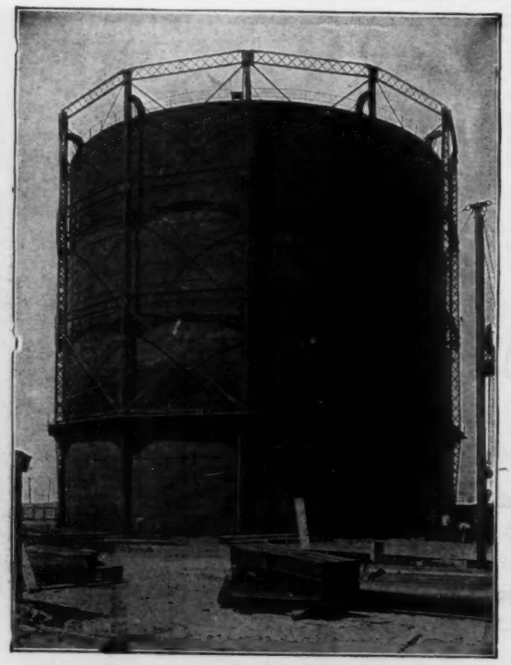

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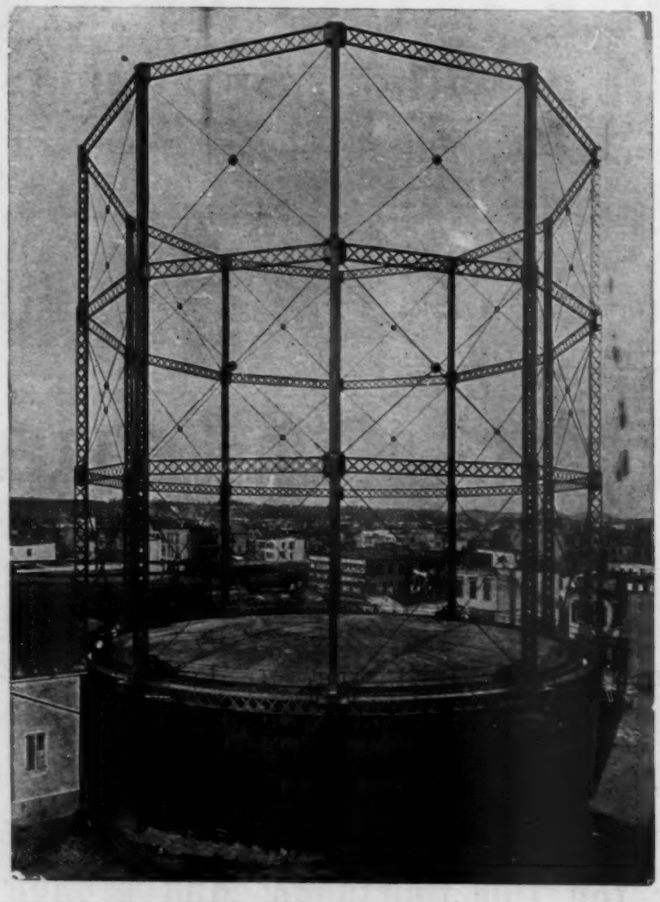

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